

AN ECOLOGICAL EXPLORATION OF SPORT SPECIALIZATION PATHWAYS

By

Justin S. DiSanti

A DISSERTATION

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

Kinesiology – Doctor of Philosophy

2019

PUBLIC ABSTRACT

AN ECOLOGICAL EXPLORATION OF SPORT SPECIALIZATION PATHWAYS

By

Justin S. DiSanti

Youth sport participation creates the opportunity for young individuals to develop not just as athletes but as people; however, to take advantage of this positive potential, a careful approach to structuring their participation must be taken. More specifically, determining how youth athletes should devote their time to one or multiple sports – and when they should transition into more specialized, single-sport participation – has been a largely underexplored area of the research. In this study, an exploratory ecological approach was taken to better understand why athletes chose their patterns of sport participation, as well as how this related to their sport expectations and experiences.

132 current high school athletes participated in the study, which surveyed elements of their sport participation, their personal and contextual characteristics, their sport behaviors and perceptions, and ultimately their sport experiences. Results of this study highlighted several significant differences between athletic patterns of participation (such as early specialization or continued multi-sport participation) and characteristics of the athlete's context (such as school size or sport type), as well as several significant relationships between their sport perceptions and sport-related experiences. Due to the exploratory nature of this study, both the significant and non-significant findings had important implications in relation to previous literature in this area, as well as for application to contemporary sport settings. Overall the results of this study stress the importance of accounting for both the person and their environment when trying to understand the selection and impact of youth athletes' sport participation pathways.

ABSTRACT

AN ECOLOGICAL EXPLORATION OF SPORT SPECIALIZATION PATHWAYS

By

Justin S. DiSanti

Youth sport specialization has been a sustained area of interest in academic and practical settings. Though preliminary findings of the relationship between athletes' pathways of sport participation and their sport outcomes posit early specialization in a single sport as potentially harmful to an athlete's physical and psychological well-being, concern that athletes are specializing earlier, and to a greater degree, than ever before remains pervasive. In analyzing potential explanations for this logical gap between recommendations and perceived behaviors, one notable gap of the literature is the lack of ecological, systems-based research that may better clarify what drives athletes to specialize in a single sport.

In this study, a developmental, ecological, perception-based approach was used to explore youth athletes' pathways of sport participation (specifically, why they chose to specialize or play multiple sports) in relation to their ecological characteristics and subsequent sport experiences. To do so, a conceptual, ecological framework was developed to inform the design of this study, and the nature and strength of relationships between variables of this novel heuristic provided an initial understanding of the ecology of sport participation pathways.

132 current high school athletes participated in this study's testing battery, which surveyed elements of their sport participation, personal and contextual characteristics, their sport specialization behaviors and perceptions, and their expectations and subsequent experiences related to their chosen pathway. Results of this study highlighted several significant group differences and relationships between variables, and due to the exploratory nature of this study

the non-significant findings also served as a hypothesis-generating mechanism for future research. Implications of these findings were explored in their relation to previous sport specialization literature and the study's guiding theoretical framework (i.e., the Developmental Model of Sport Participation and the Person-Process-Context-Time Ecological Model), and the results underscored the importance of accounting for the influence of context and competitive climate in understanding youth athletes' selected sport pathways and subsequent experiences.

Copyright by
JUSTIN S DISANTI
2019

ACKNOWLEDGMENTS

I would first like to thank my parents, John & Judy, as well as my siblings, Jana & Jared, for their constant encouragement throughout my academic journey. Thank you for instilling in me a yearning for growth, a love of education and sports, and a belief that I could be successful in combining my passions if I put my mind and heart into my work. You have been there through the many ups and downs and have always provided comfort, guidance, and levity when I've needed each of these the most. I could not have made it to this point without your constant care and support.

I would also like to thank my advisor and mentor, Dr. Karl Erickson, for his guidance and support during my graduate education. I have grown so much from your purposeful mentorship and the constant example you set, more than academically but also as a well-rounded person. As I move forward I hope to pass on your genuine enthusiasm for the work we do to my own colleagues and students, while emulating the thoughtfulness, care, and positive attitude you show in our day-to-day interactions. I also extend my sincere thanks to my dissertation committee, Drs. Dan Gould, Nick Myers, and Francisco Villarruel; each of you has made a significant positive impact in my growth as a scholar through your instruction, mentorship, and collegial approach during my time as a Michigan State student. Thank you for the time and energy you have invested in me.

I'd also like to give a special thanks to my fellow MSU graduate students, the members of ISYS, and all of the people who help build the sense of community in the Kinesiology department. Though I owe too many individuals a debt of gratitude to name here, it is the relationships that I have made at MSU that will stick with me most. I look forward to crossing paths with you all as we move forward in our academic and life journeys.

TABLE OF CONTENTS

LIST OF TABLES	xi
LIST OF FIGURES	xii
CHAPTER I: INTRODUCTION.....	1
Background and Significance	1
Theoretical Framework.....	1
Developmental model of sport participation (DMSP)	2
Person-Process-Context-Time (PPCT) ecological model.....	3
Statement of the Problem.....	4
Purpose of the Study	6
Organization of the Dissertation	7
CHAPTER II: REVIEW OF THE LITERATURE	8
Multidisciplinary Scoping Systematic Review of Youth Sport Specialization	8
What is known about this topic?.....	9
Sport specialization participation behaviors	9
Sport participation history.....	9
Age at specialization	10
Prevalence of specialization.....	12
Contextual considerations	12
Sport specialization outcomes.....	13
Physiological.....	13
Psychosocial.....	14
Talent development.....	16
How is it known?	17
Where do we go from here?.....	20
Critique of Sport Specialization Literature through the PPCT Ecological Model.....	22
Sport specialization through the PPCT lens.....	22
Person.....	24
Demand	24
Resource.....	26
Force	26
Process	27
Context.....	31
Microsystem.....	32
Mesosystem.....	32
Exosystem	33
Macrosystem	33
Time	34
Micro-time	35
Meso-time	36
Macro-time.....	36

Timing.....	37
Youth Sport Specialization Perception Scale	38
Qualitative Thematic Analysis of Sport Participation Pathways.....	39
Developmental Model of Sport Participation (DMSP).....	39
Results of qualitative thematic analysis.....	41
Comparing High School & Club Coach Perceptions of Sport Specialization	42
The Current Study.....	43
CHAPTER III: METHODS	46
Participants.....	46
Procedure	46
Proposed Ecological Framework of Sport Participation Pathways	48
Variables	49
Individual characteristics	49
Ability	49
Affect	50
Agency	50
Contextual characteristics	51
School size	51
Signature sport type	52
Sport gender	52
Participation pathway.....	52
Perceptions of sport specialization.....	53
Sport pathway expectations	54
Expectation of sport enjoyment	55
Expectation of social enjoyment.....	55
Expectation of performance success	55
Sport pathway experiences	55
Perceived pathway satisfaction	56
Perceived social enjoyment.....	56
Perceived sport competence.....	56
Burnout	57
Data Analysis Strategy.....	57
Preliminary demographic and sport background analyses.....	58
Prevalence of athletes currently specializing.....	59
Participation pathway & age	59
Participation pathway & number of sports	59
Contextual characteristics & number of sports	60
Participation pathway & perceptions of sport specialization.....	60
Primary analyses: Relationships of proposed conceptual framework variables.	60
Individual characteristics & participation pathway	61
Individual characteristics & perceptions of specialization	61
Contextual characteristics & participation pathway	61
Contextual characteristics & perceptions of sport specialization .	61
Participation pathway & sport pathway expectations	62

Participation pathway & sport pathway experiences	62
Perceptions of specialization & sport pathway expectations	62
Perceptions of specialization & sport pathway experiences	62
Pathway expectation & perceived pathway experience variables	63
Secondary analyses: Exploratory relationships	63
Individual characteristics & participation pathway groups	63
Individual characteristics & perceptions of specialization	64
Correlations of pathway expectation & pathway experience variables by pathway groups.....	64
Methodological Considerations	65
CHAPTER IV: RESULTS.....	66
Descriptive Results of Demographic & Sport Background Characteristics	66
Preliminary Demographic and Sport Background Analyses	69
Prevalence of athletes currently specializing.....	69
Participation pathway & age	69
Participation pathway & number of sports	69
Contextual characteristics & number of sports	70
Participation pathway & perceptions of sport specialization.....	71
Primary Analyses: Relationships of Proposed Conceptual Framework Variables	72
Individual characteristics & participation pathway	73
Individual characteristics & perceptions of sport specialization	74
Contextual characteristics & participation pathway	75
Contextual characteristics & perceptions of sport specialization	76
Participation pathway & sport pathway expectations	77
Participation pathway & sport pathway experiences	78
Perceptions of specialization & sport pathway expectations	80
Perceptions of specialization & sport pathway experiences	81
Pathway expectation & perceived pathway experience variables	82
Secondary Analyses: Exploratory Relationships	83
Participation pathway groups & perceptions of specialization: Contextual characteristic covariates	83
Individual characteristics & specialization factors	84
Correlations of pathway expectation & pathway experience variables by pathway groups.....	85
Summary	86
CHAPTER V: DISCUSSION.....	90
Preliminary Demographic and Sport Background Results	91
Prevalence of athletes currently specializing.....	91
Participation pathway & age	92
Participation pathway & number of sports	93
Contextual characteristics & number of sports	94
Participation pathway & perceptions of sport specialization.....	95
Primary Results: Relationships of Proposed Conceptual Framework Variables.....	97
Individual characteristics & participation pathway	97

Ability & participation pathway	97
Affect & participation pathway	98
Agency & participation pathway	98
Individual characteristics & perceptions of sport specialization	99
Ability & perceptions of sport specialization	99
Affect & perceptions of sport specialization	100
Agency & perceptions of sport specialization	101
Contextual characteristics & participation pathway	102
School size & participation pathway	102
Signature sport type & participation pathway	102
Sport gender & participation pathway	103
Contextual characteristics & perceptions of sport specialization	103
School size & perceptions of sport specialization	103
Signature sport type & perceptions of sport specialization	104
Sport gender & perceptions of sport specialization	104
Participation pathway & sport pathway expectations	105
Participation pathway & expectation of sport enjoyment.....	105
Participation pathway & expectation of social enjoyment	106
Participation pathway & expectation of performance success ..	106
Participation pathway & sport pathway experiences	107
Participation pathway & perceived pathway satisfaction	107
Participation pathway & perceived social enjoyment.....	108
Participation pathway & perceived sport competence.....	109
Participation pathway & burnout	110
Perceptions of specialization & sport pathway expectations.....	110
Perceptions of sport specialization & expectation of sport enjoyment.....	111
Perceptions of sport specialization & expectation of social enjoyment.....	111
Perceptions of sport specialization & expectation of performance success	112
Perceptions of specialization & sport pathway experiences	112
Perceptions of sport specialization & perceived pathway satisfaction	112
Perceptions of sport specialization & perceived social enjoyment.....	113
Perceptions of sport specialization & perceived sport competence	113
Perceptions of sport specialization & burnout	114
Pathway expectation & perceived pathway experience variables	114
Expectation for sport enjoyment & perceived pathway satisfaction	115
Expectation for social enjoyment & perceived social enjoyment.....	115
Expectation for performance success & perceived sport competence	115

Secondary Exploratory Results	116
Participation pathway perceptions of specialization:	
Contextual characteristic covariates	116
Individual characteristics & specialization factors multiple	
linear regression	117
Correlations of pathway expectation & pathway experience	
variables by pathway groups	118
Theoretical Model Implications	119
Developmental Model of Sport Participation (DMSP)	119
Person-Process-Context-Time (PPCT) Model	123
Person	123
Process	123
Context	124
Time	125
Limitations & Methodological Considerations	126
Future Research Directions	130
Conclusion	132
APPENDICES	134
Appendix A: IRB Approval	135
Appendix B: Summary of Testing Battery	136
Appendix C: Full Testing Battery	137
REFERENCES	147

LIST OF TABLES

Table 2.1. Descriptive Results of Empirical Research	18
Table 3.1. Specialization Status of Operational Pathways Across Development.....	53
Table 4.1. Demographic & Sport Background Frequencies of Total Sample	66
Table 4.2. Demographic & Sport Background Frequencies by Participation Pathways	67
Table 4.3. Number of Sports Played at any Point by Category of Contextual Characteristics.....	70
Table 4.4. Number of Sports Currently Playing by Category of Contextual Characteristics.....	71
Table 4.5. Mean Ratings of Individual Characteristics by Participation Pathway Groups.....	74
Table 4.6. Multiple Linear Regression Results for Participation Pathway by Individual Characteristics	84
Table 4.7. Multiple Linear Regression Results for Perceptions of Specialization by Individual Characteristics	85
Table 4.8. Correlations of Pathway Expectation and Pathway Experience Variables by Participation Pathway	86
Table A.1. Summary of Testing Battery	136

LIST OF FIGURES

Figure 2.1. Resulting Thematic Structure of Empirical Findings via Narrative Analysis	9
Figure 2.2. Conceptual Flow Chart of PPCT Model	23
Figure 2.3. DMSP Pathways: Specialization Status Across Development.....	40
Figure 2.4. Conceptual Diagram of Factor Categories	43
Figure 2.5. Proposed Ecological Conceptual Framework of Sport Participation Pathways.....	45
Figure 3.1. Conceptual Diagram of Factor Categories	49
Figure 3.2. Proposed Ecological Conceptual Framework of Sport Participation Pathways.....	49
Figure 3.3. Operationalized Proposed Ecological Conceptual Framework.....	58
Figure 4.1. Full Operationalized Proposed Ecological Conceptual Framework	72
Figure 4.2. Individual Characteristics and Participation Pathway	73
Figure 4.3. Individual Characteristics and Perceptions of Sport Specialization.....	74
Figure 4.4. Individual Characteristics and Participation Pathway	75
Figure 4.5. Contextual Characteristics and Perceptions of Sport Specialization.....	76
Figure 4.6. Participation Pathway and Sport Pathway Expectations	77
Figure 4.7. Participation Pathway and Sport Pathway Experiences	78
Figure 4.8. Perceptions of Sport Specialization and Sport Pathway Expectations.....	80
Figure 4.9. Perceptions of Sport Specialization and Sport Pathway Experiences	81
Figure 4.10. Pathway Expectation & Perceived Pathway Experience Variables	82
Figure 4.11. Results of Analysis of Group Differences Between Variables	87
Figure 4.12. Results of Correlation Analyses Between Variables.....	88

CHAPTER I: INTRODUCTION

Background & Significance

Youth sport participation has been shown to impact the lives of developing individuals – not just in terms of physical development, but also in the psychosocial domain (Gould & Carson, 2008). Though proponents of youth sport often herald the multifaceted positive effects of participation, research has shown that the potential for a negative developmental impact also exists (e.g., Fraser-Thomas, Côté, Deakin, 2008; Hall et al., 2015). Therefore, determining how to optimally structure a youth athlete’s sport participation to facilitate positive holistic growth has become a frequent topic of popular conversation and scholarly research. Specifically, understanding when (and to what degree) youth athletes should specialize within a single sport or distribute their time and effort across multiple sports has been a sustained and largely unanswered line of inquiry (e.g., Hill, 1987; Barynina & Vaitsekhovskii, 1989; Baker, Cobley, & Fraser-Thomas, 2009). This dissertation’s first chapter will begin by providing an overview of the theoretical foundation of this study, follow with an overview of my on-going line of research inquiry into this topic which will summarize key findings and highlight important gaps in sport specialization knowledge still lacking within the larger base of the literature, and conclude with the purpose and guiding aims of my dissertation.

Theoretical Framework

Though a precise consensus in defining sport specialization is lacking (e.g., Hill, 1989; Jayanthi et al., 2013; LaPrade et al., 2016; Wiersma, 2000), to provide a more specific conceptualization of this term in the scope of this dissertation, sport specialization will be operationally defined as “an investment in a single sport through systematic training and competition, typically including year-round participation in that sport, to pursue proficiency and

enjoyment in a ‘signature’ activity” (Vealey & Chase, 2016). Additionally, two prominent models in youth sport and social sciences are critical to understanding this study: The Developmental Model of Sport Participation (DMSP) and Bronfenbrenner’s “Person-Process-Context-Time” Ecological Model.

Developmental model of sport participation (DMSP). To further clarify the notion of sport specialization throughout this study, the Developmental Model of Sport Participation (DMSP)(Côté, 1999; Côté, Baker, & Abernethy, 2003) is used to illustrate the sample’s participation across the course of their youth sport careers. It should also be noted that my initial problematization and examination of youth sport specialization – which led to my resulting master’s thesis (DiSanti, Chase, Vealey, & Horn, 2016) – was guided by the central tenets of the DMSP. Therefore, this model is a vital element of my past and ongoing conceptualization, research approach, and interpretation of sport specialization and athlete participation pathways.

The DMSP was first to describe different pathways an athlete can take throughout their youth sport trajectories, while also identifying meaningful implications associated with these pathways (Côté, Baker, & Abernethy, 2007). This model uses three timepoints – roughly matching the time an athlete is in elementary school, middle school, and high school – resulting in three major pathways:

- *1) Elite performance via early specialization* (i.e., “**Early Specialization**” or “**ES**”)→ viewed as maladaptive due to increased likelihood of adverse physical and psychosocial consequences. Specialization occurs during middle school or earlier and continues through high school participation. This pathway is associated with professionalized attitudes towards sport participation, emphasizing elite performance over fun from an early age.

- 2) *Elite performance via early sampling* (i.e., “**Late Specialization**” or “**LS**”)→ viewed as the most holistically adaptive pathway in terms of developing athletic talent into expert performance; an optimal balance of talent development and positive youth development. In this pathway, athletes begin by sampling a wide variety of sports in early youth sport before gradually paring down the number of sports played while investing more sport-specific training time within each sport, before finally investing in specialized, elite-focused training and competition around the time the athlete enters high school. This pathway emphasizes building a broad foundation of sport skills and experiences at an early age while fostering a sense of passion for sport involvement, allowing the athlete to make an informed decision of the sports in which they are most passionate and talented to pursue elite-status attainment.
- 3) *Recreational pathway through continued sampling* (i.e., “**Recreational Multisport**” or “**RM**”)→ viewed as most optimal for continued sport participation and enjoyment, but less likely to lead to elite talent development. Athletes in this pathway maintain multi-sport participation throughout their athletic trajectories, allowing them to continue sampling multiple sports for the purpose of enjoyment and sustained participation. However, the lack of specialized, invested training in the later stages of their participation (especially in high school) are seen as less likely to lead to elite status attainment.

Person-Process-Context-Time (PPCT) ecological model. The second important model utilized in this study is the Person-Process-Context-Time (PPCT) Ecological Model. This model arose from Bronfenbrenner’s extended work in understanding how an individual reads, reacts, and interacts with their surrounding systems (Bronfenbrenner, 1979; Bronfenbrenner & Morris, 1998) This ecological approach aims to better describe the complex processes by which a person

develops and functions within the social world. To more succinctly operationalize this approach, the PPCT Model utilizes the following four heuristic constructs:

- 1) *Person* → an individual's attributes and characteristics that serve as a filter for how they will interpret and interact with any social situation; the most central unit of the ecological system
- 2) *Process* → how a person connects to their surroundings over time; how an individual understands, challenges, and integrates elements of their proximal environment
- 3) *Context* → the different systems that comprise a person's ecology, moving from most proximal to most distal from the individual; multidimensional framework that includes interrelations of the environment, social actors, and attitudes/values/beliefs that influence an individual
- 4) *Time* → comprised of different units of time that impact the way an individual perceives the connection between themselves and their environment over the course of their development

In conclusion, this working definition of sport specialization and two major models are instrumental in shaping the proposed study – in terms of how the existing literature is interpreted, in the study's design, as well as the significance and application of the study's findings in academic and practical domains.

Statement of the Problem

The prevalence of athletes specializing earlier – and to a greater degree – in their sport careers has been perceived in the popular and scholarly domains as on the rise (e.g., Malina, 2010; Matz, 2014;). Concern regarding the link between this trend of early sport specialization and the potential for adverse effects in an athlete's development are nothing new; as early as

1987, high school coaches and athletic directors identified increased sport specialization as a major issue (Hill & Hansen, 1987; Hill, 1993). Despite this prolonged interest, thorough empirical investigation of the holistic impact of specialization has been largely insufficient (Baker et al., 2009; DiSanti & Erickson, 2018). However, a proliferating accumulation of research in the sports medicine domain in recent years has consistently found an adverse physical impact of specialization: Athletes who specialize earlier (and to a greater degree) are more likely to sustain and report a variety of overuse injuries than their less-specialized peers (e.g., Bell, Post, Trigsted, Hetzel, McGuine, & Brooks, 2016; Jayanthi et al., 2015; Post, Thein-Nissenbaum, et al., 2017). Though this area of the literature comprises only a small portion of the full picture of specialized athletic participation, these findings do validate the importance and urgency of altering sport pathways and the overarching climate in which they exist in order to enhance the likelihood of healthy, developmentally appropriate experiences for youth athletes.

Today, professional guidance for youth athletes regarding sport specialization is everywhere, with major organizations such as the International Olympic Committee, International Society of Sport Psychology, and the American Orthopedic Society for Sports Medicine putting forth statements and recommendations (Bergeron et al., 2016; Côté, Lidor, & Hackfort, 2009; LaPrade et al., 2016). The consensus regarding this issue is that specializing in one sport during youth presents greater risk to an athlete's overall developmental experience (e.g., psychological well-being, injury risk, development of identity), and athletes should instead favor early sampling of multiple sports (Côté et al., 2009; Goodway & Robinson, 2015). However, these statements and recommendations have seemingly failed to slow the trend of athletes specializing at an earlier age and greater degree than ever before (Smith, 2015; Bell et al., 2016; Buckley et al., 2017). In conjunction with the wealth of recent findings elucidating the

harmful impact of specializing, there is a frustrating logical gap between how athletes *should* be structuring their participation and what they *are* doing.

Underlying causes for this disconnect have been identified conceptually, such as the desire to achieve elite status or obtain external rewards (e.g., college scholarships, sponsorship) (Malina, 2010), as well as an increasingly “professionalized” climate of youth sport (Gregory, 2017). Yet, empirical investigation of this phenomenon within the larger youth sport landscape has remained grossly lacking and has been hampered by issues of methodology and interpretation (Baker et al., 2009; DiSanti & Erickson, 2019), leaving proponents of developmentally appropriate youth sport without any clear avenues for alleviating this concerning trend.

As previously mentioned, in research specialization has frequently been framed as a “choice” or “decision” that is implicitly assigned exclusively to the athlete. However, this clashes with various perspective pieces and popular discussion which acknowledge the presence of outside influences (e.g., social actors, professionalized climate of contemporary sport, etc.). Specialization is often posited as a highly complex phenomenon; through its theory-driven ecological approach, this dissertation takes an important step in treating it as such.

Purpose of the Study

The purpose of this dissertation was to examine youth athletes’ pathways of sport participation (specifically, why they chose to specialize vs. play multiple sports) through an exploratory ecological approach. This dissertation study aimed to examine a large, diverse sample of currently competing high school athletes spanning various sports, characteristics, and competitive contexts to better understand sport specialization in the contemporary climate of youth sport. In order to do so, a novel, conceptual ecological framework built from my previous

empirical work and review of the literature served as the overarching structure of the study's design. It should be noted that this conceptual framework was not viewed as an exhaustive collection of every ecological factor influencing the sport participation pathway process, nor was it intended as a structural equation measurement model of these many factors. However, through exploring the nature and strength of relationships between the variables integrated and situated in this proposed ecological framework, this study sought to explore the degree to which this working heuristic reflected a practical understanding of athletes' participation pathway experiences, and was guided by two broad research questions:

- Q1:** What are the relationships between characteristics of the athlete's ecology and their pathway selection?
- Q2:** What are the relationships between the participant's pathway and their sport experience/developmental outcomes?

Organization of the Dissertation

Following this introductory overview of the dissertation, a thorough review of literature will be provided to summarize and contextualize my previous research in relation to the accumulated sport specialization literature, while also underscoring the importance of the current study in filling important gaps in knowledge. Next, the approach to answering these research questions will be detailed in the methods section, followed by the results of the collected data. Finally, the discussion chapter will delve into the implications of this study's findings while noting important considerations and limitations related to the study design and application in practical settings.

CHAPTER II: REVIEW OF LITERATURE

In this chapter, literature relevant to this dissertation will be detailed to position this study within the larger scope of accumulated research. To do so, this chapter will walk through my existing line of research of youth sport specialization and athlete participation pathways; this will serve to better frame an understanding of strengths and weaknesses of previous research in this area, guide the reader through my research strategy as I have structured this agenda, and highlight the key findings and identified gaps that led to the design and execution of this dissertation study.

Multidisciplinary Scoping Systematic Review of Youth Sport Specialization

The first study in this line of research at Michigan State University was an accumulation and thorough analysis of the existing base of youth sport specialization research via a multidisciplinary, scoping systematic review (DiSanti & Erickson, 2019). The characteristics of this review's design were selected carefully and purposefully: Though conceptual models (i.e., DMSP, Côté, 1999; LTAD, Balyi & Hamilton, 2004), organizational recommendations (e.g., Bergeron et al., 2016; LaPrade et al., 2016), and perspective pieces (e.g., Coakley, 2015; Horn, 2015) have been put forth in regards to structuring youth athletes' pathways of participation, the perceived gap between these recommendations and the perceived rising prevalence of specialized youth athletes lends to the notion that the existing research base may not be accounting for the whole picture in regards to this phenomenon. Thus, this systematic review not only sought to make conceptual links between *what* is known about the topic, but also *how* it is known (e.g., field of publication, participant role, study design, etc.) and *where* the field needs to go in future research to better assist youth sport stakeholders in this critical issue.

What is known about this topic? Initial analysis of the collected body of literature focused on identifying common characteristics of empirical findings in the article population. From the subsequent scoping narrative analysis, two overarching themes of sport specialization behaviors (i.e., sport participation history, age at specialization, prevalence of specialization, contextual considerations) and outcomes stemming from specialized sport participation (physiological, psychosocial, talent development) emerged; this resulting structure is summarized in Figure 2.1:

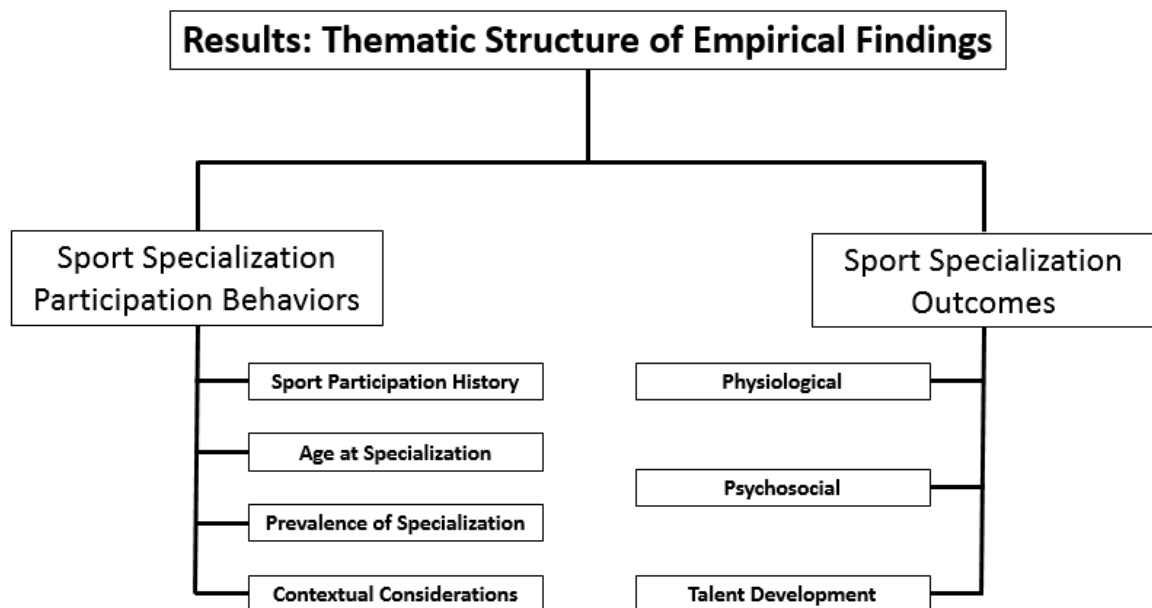


Figure 2.1. Resulting Thematic Structure of Empirical Findings via Narrative Analysis

Sport specialization participation behaviors.

Sport participation history. The first major theme of the empirical research related to youth sport specialization illustrated behaviors related to specialized sport participation. An important way of exploring this theme was through examination of athletes' histories of sport participation in general, as well as specifically when they specialized in their signature sport. This line of research commonly showed early sampling to be a characteristic of athletes who

reached elite status (Baker et al., 2005; Coutinho, Mesquita, Davids, Fonseca, & Côté, 2016; Leite, Baker, & Sampaio, 2009; Soberlak & Côté, 2003); however, early specialization was linked to higher achievement for athletes in sports with earlier performance peak ages, such as figure skating (Starkes, Deakin, Hodges, Allard, & Hayes, 1996) and rhythmic gymnastics (Law, Côté, & Ericsson, 2007). Additionally, most elite level athletes maintained multisport participation throughout their time in high school – this was observed in minor league baseball players (Ginsburg et al., 2014; Hill, 1993), elite swimmers (Barynina & Vaitsekhovskii, 1989), and elite field hockey, rugby, and water polo athletes (Stevenson, 1990). Ginsburg et al. (2014) found that while many athletes specialized late in high school, once they did so they invested more time in training than those who had specialized earlier. Post and colleagues supported this notion, finding that athletes with a high degree of specialization started playing their primary sport earlier and for more months per year than groups with lower degrees of specialization (Post, Trigsted, et al., 2017). A qualitative study challenged the common dichotomy of “early specialists” and “early samplers” as a sufficient framework for separating participation pathways based on their sample; instead, they found that trajectories were nonlinear and unique to each athlete, with inconsistent ages for transition points and alternative patterns such as late entry into their main sport (Storm, Kristoffer, & Krogh, 2012).

Age at specialization. One of the major issues mentioned in the specialization literature is when athletes should specialize. This research has typically examined the age of specialization for elite level athletes, such as minor league baseball players (M age of specialization = 15.52 years old)(Ginsburg et al., 2014), former Soviet national-level swimmers (specialized at approximately 10-12 years old)(Barynina & Vaitsekhovskii, 1989), and African international-level volleyball players (most common range for age of specialization = 13-15 years

old)(Gitonga, Bailasha, & Toriola, 2011). In contrast, a study of U.S. collegiate undergraduates who formerly competed in a variety of sports indicated that most participants (i.e., 71%) specialized prior to age 10, with the most commonly reported age at specialization being six years old (Russell, 2014).

Between-group comparisons of age at specialization have also been conducted: Buckley et al. (2017) found that currently competing high school students specialized an average of two years earlier ($M = 12.7$) than current collegiate ($M = 14.8$) and professional athletes ($M = 14.7$) did. A group comparison of Portuguese athletes found that experts specialized in their signature sport significantly later ($M = 16.9$) than those who had started on an elite track early in their life but had failed to reach expertise ($M = 14.7$) (Barreiros, Côté, & Fonseca, 2012). Comparisons between professional Australian athletes deemed as expert and non-expert decision-makers showed that both groups spent similar time in primary sport training and other sport activities until age 12, when the experts undertook more specialized training for their primary sport (Baker, Côté, & Abernethy, 2003). A similar design measuring elite and near-elite Danish athletes found that the elite group engaged in less specialized training prior to age 15 before evening out from ages 15-18, then invested more time in their signature sport after age 18 (Moesch, Elbe, Hauge, & Wikman, 2011). However, the athletes of this study did not significantly differ in the number of other sports played throughout their careers, and a later study found elite and near-elite athletes' training and competition pathways to be more similar than different (Moesch, Hauge, Wikman, & Elbe, 2013). Similar results were found in a retrospective examination of British athletes, showing that athletes who competed in three or more sports prior to age 15 were significantly more likely to reach national level competition at ages 16 and 18 than those who exclusively played one sport (Bridge & Toms, 2013). A study of

elite vs. non-elite English soccer players showed no significant group differences in number of sports played or age at which they specialized; the elite group did, however, accumulate more hours in soccer-specific training (Ward, Hodges, Starkes, & Williams, 2007). This disparity was replicated in a study of elite cricket players, though groups only differed from the ages of 13-15 (Ford, Low, McRobert, & Williams, 2010).

Prevalence of specialization. Early work examining specialized sport participation did not measure the actual prevalence of this practice but did account for the perceived prevalence of specialization by invested sport stakeholders. Hill & Simons' (1989) survey of American high school athletic directors indicated that 71.3% of participants felt that early specialization was increasing, with 60.5% reporting that specialized participation was likely to continue to increase over the next 10 years. This assertion has only recently been tested through measuring the prevalence of specialization: First, Russell (2014) surveyed undergraduate participants who were former athletes, 56% of whom reported specializing in a single youth sport. This rate was observed to be even higher in a subsequent study, with 63% of participants self-reporting as youth sport specialists (Russell & Symonds, 2015). Two studies with more nuanced methodology detailing the "degree of specialization" for large samples of high school athletes found the distribution for degree of specialization to be 34.8% low, 28.8% moderate, and 36.8% high (Bell et al., 2016), and 59.5% low, 27.1% moderate, and 13.4% high (Post, Bell et al., 2017). In comparison, U.S. collegiate Division I athletes demonstrated a lower rate of "high" specialization (30.4%), indicating that most collegiate athletes were not highly specialized throughout their high school careers (Post, Thein-Nissenbaum et al., 2017).

Contextual considerations. Lastly, several avenues of research which linked characteristics of an athlete's context to sport specialization behaviors were important to include.

For example, one hypothesized mediator of specialization behaviors and perceptions is school size; Bell et al. (2016) found that athletes in small schools were more likely to be classified in the “low specialization” group and self-identify as “multi-sport athletes” than those who attended a larger-sized school. With respect to the athlete’s sex, limited research in this domain suggests females tend to specialize earlier than males, specialize to a greater degree than males, and feel greater uncertainty or doubt regarding their decision to play one vs. multiple sports (Barynina & Vaitsekhovskii, 1989; Post, Trigsted et al., 2017; Stevenson, 1990). However, it is also important to note that a large study of US collegiate Division I athletes did not support these findings, as no difference in degree of specialization was observed between the sexes (Post, Bell et al., 2017). Initial exploration into sport type has also been conducted, finding that among athletes currently competing at the U.S. collegiate level, those who primarily compete in an individual sport (e.g., swimming, figure skating, track and field) were more than twice as likely to specialize in youth/early adolescence in comparison to team sports (Buckley et al., 2017).

Sport specialization outcomes

Physiological. A focal point of physiological outcomes related to youth sport specialization has been the incidence of overuse injuries. Hall, Barber Foss, Hewett, & Myer (2015) found that for currently competing middle school and high school athletes in the U.S., single-sport specialization was associated with increased likelihood of anterior knee pain and apophyseal injuries. Multiple research publications have shown that athletes classified as “highly-specialized” are significantly more likely to report an injury than moderate or low-specialized athletes, including overuse injuries (Jayanthi, Dechart, Durazo, Dugas, & Luke, 2011; Jayanthi et al., 2015), overuse knee injuries (Bell et al., 2016), or a lower extremity injury (Post, Bell et al., 2017). Additionally, single-sport specialization has appeared to factor into an

athlete's self-perception of injury, with highly specialized athletes demonstrating a higher propensity for reporting injuries (Post, Bell et al., 2017; Post, Trigsted et al., 2017).

Beyond injury, an examination of physical fitness and gross motor coordination revealed that multisport participants initially lagged behind early specialists in markers of explosive strength and gross motor coordination before age 10; however, this effect was reversed in ages 10-12, with early samplers demonstrating an advantage in explosive strength, speed and agility, cardiovascular health, and gross motor coordination compared to early specialists (Fransen et al., 2012).

Characteristics of physical fitness later in life have also been linked to specialized youth sport participation. A line by Russell found that there were no significant group differences in physical activity engagement and enjoyment; however, specialists were less likely to be involved in organized sports as an adult in comparison to the multisport athletes (Russell, 2014; Russell & Limle, 2013; Russell & Symonds, 2015). Another related finding of this research was that enjoyment of physical activity as an adult was predicted by perceived enjoyment of the youth sport experience – regardless of participation pathway.

Psychosocial. Strachan, Côté, & Deakin (2009) found that for operationally-defined early “specializers” and “samplers,” these two groups did not differ significantly in their psychosocial developmental assets profile or sport enjoyment, but they did find that specialists were more likely to be burned out – specifically in the factor of physical/emotional exhaustion. In addition, early sampling athletes had a more integrated experience of sport participation with their family and community (Strachan et al., 2009). Russell also conducted a comparison using this group classification through the scope of Self-Determination Theory (i.e., Deci & Ryan, 1985), finding that specialists scored significantly higher on the “intrinsic motivation – to know” and

“extrinsic motivation – introjected regulation” in comparison to non-specializers, though no other inter-group differences in motivation were significant (Russell, 2014). Interviews of elite British and Canadian athletes noted that participants consistently expressed a high degree of career satisfaction and little doubt or uncertainty about their decision of when to specialize (Stevenson, 1990), and 83% of a large sample of former athletes indicated being “glad” that they focused on one sport when they did, regardless of the point at which that occurred (Buckley et al., 2017).

However, there also appears the potential for negative psychosocial outcomes stemming from specialization (Fraser-Thomas & Côté, 2008). Early in the literature, Hill & Simons (1989) surveyed high school athletic directors and a majority (55.6%) believed that specialization increases the risk of athletic burnout. An examination of currently-competing and dropout Canadian minor hockey players failed to support this assertion, finding that both active and dropout groups had similar early participation pathways and spent similar time in on-ice training and competition; however, time spent in off-ice training (linked conceptually to early sport specialization) was related to increased dropout and decreased enjoyment (Wall & Côté, 2007). Another study of Canadian hockey players found no significant differences between early specializers, early samplers, and recreational multisport athletes on measures of psychological need satisfaction, mental health, or mental illness. However, the participant scores of psychological need dissatisfaction exhibited a significant pathway effect, such that early specializers averaged the highest score in this negative dimension of the three groups (McFadden, Bean, Fortier, & Post, 2016). Finally, parents of youth soccer players reported that their family enjoyed soccer less when they had to sacrifice other family activities and community engagements due to sport (Livingston, Schmidt, & Lehman, 2016).

The final psychosocial outcome related to specializing is the perception of control an athlete has in this decision. It has been proposed that forces outside of the athletes' control (i.e., parents, coaches, administrators, etc.) persuade athletes to specialize. Research delving into the issue of athlete self-selection vs. externally-pressured sport specialization has been limited, and equivocal: Ginsburg et al. (2014) found that 44% of athletes deemed the decision to specialize as self-determined, compared to only 26% who said another person (fathers, in particular) influenced their decision to specialize. Stevenson (1990) found that for many athletes, there simply came a point at which they conducted a cost-benefit analysis regarding how to allocate their time and energy, based on what he termed "relative potential for success;" however, the personal, temporal, and environmental influences that initiated this self-analysis were still unclear. A study of elite African volleyball players did list "family member influence" as a factor in their decision to specialize, though this was only the 5th highest rated reason reported (Gitonga et al., 2011).

Talent development. The final group of outcomes relates to talent development – both in terms of participant perceptions of utility, as well as status-driven outcomes. An initial study of high school coaches indicated that coaches perceived specialization as a negative impactor of the high school sport experience, and did not support coaches who endorsed this practice; however, they also believed that specializing would lead to greater career success, a finding reinforced later with a sample of high school athletic directors (Hill & Hansen, 1987; Hill & Simons, 1989). A study of minor league baseball players in the U.S. later replicated this logical gap – players felt that specializing enhanced athletic performance and the likelihood of reaching elite status, yet the majority did not support specializing in adolescence and would not recommend this strategy for their own children (Hill, 1993).

More recently, Buckley et al. (2017) found that the vast majority of currently-competing participants viewed specializing as helpful to playing sport “at a higher level,” though the affirmative response rate was significantly lower for professional athletes (61.7%) than the high school and college groups (79.7% and 80.6%, respectively). A qualitative study with elite German coaches generally supported early sampling, though they emphasized the individual athlete’s trajectory in determining the utility of specializing or sampling and felt that these two pathways were overly dichotomous and misrepresentative of their athletes’ participation (Voigt & Hohmann, 2016).

More objective measurement linking specialization and performance outcomes has also been conducted. Barynina & Vaitsekhovskii (1989) found that early specialization offered no advantage in arriving at “superior sport results,” and athletes who specialized earlier had shorter careers while expressing disappointment about their exit from sport. A more recent line detailing elite English soccer players refuted this notion, finding that athletes who “engaged” in sport-specific training and competition prior to age 12 – while lacking any engagement in alternative sports – were more likely to reach elite status (Ford, Ward et al., 2009; Ford, Low et al., 2009). In terms of positive outcomes, Ginsburg et al.’s (2014) study of minor league baseball players found that athletes who had received a college athletic scholarship had specialized at a later age ($M = 16.28$) than those who did not receive a scholarship ($M = 14.64$). A comparison of German Olympians found that medal-winning athletes had started intensive training in their signature sport at a later stage in their careers than non-medalists, while also maintaining multisport participation into a later age (Güllich, 2016).

How is it known? The above section illuminates the key findings and research questions that have guided the exploration and application of youth sport specialization findings. However,

because of this area's still underdeveloped nature, it is also important to contextualize these findings through examining *how* these findings have come about. A full summary of descriptive results of the multidisciplinary scoping systematic review are presented in Table 2.1.

Table 2.1.
Descriptive Results of Empirical Research

Classification	Number of Articles	Percentage
<i>Field of Publication</i>		
Sport Psychology	19	47.5%
Sport Medicine	9	22.5%
Sport Sociology	5	12.5%
Sport Sciences	5	12.5%
Sport Pedagogy	2	5%
<i>Study Design</i>		
Retrospective	26	65%
Cross-Sectional	11	27.5%
Case-Control	2	5%
Prospective	1	2.5%
<i>Participant Role</i>		
Athlete	35	87.5%
Parent	2	5%
Coach	2	5%
Athletic Director	1	2.5%
<i>Level of Competition</i>		
Youth Sport	11	27.5%
High School Sport	5	12.5%
Elite Sport	18	45%
Multiple Levels	6	15%
<i>Data Type</i>		
Quantitative	33	82.5%
Qualitative	5	12.5%

Table 2.1. (cont'd)

Mixed-Method	2	5%
<i>Definition of Specialization</i>		
Provided	13	32.5%
Not Provided	27	67.5%
<i>Conceptual Model</i>		
Developmental Model of Sport Participation (DMSP)	13	32.5%
Theory of Deliberate Practice	3	7.5%
Self-Determination Theory	2	5%
Sport Commitment Model	1	2.5%
No Model Used	21	52.5%

40 total empirical studies were identified through the inclusion/exclusion criteria of the review, though it was noted that many of these studies failed to isolate the topics of sport specialization from “elite talent development” (e.g., Fransen et al., 2012; Güllich, 2016). Only 32.5% of the studies (n = 13) operationally defined the term “specialization,” with the most common definition (n = 10) being “intense, year-round training in a single sport at the exclusion of other sports or activities” (Wiersma, 2000). Additionally, 37 of the 40 studies viewed specializing as dichotomous (yes/no), while only 3 allowed for a more nuanced “degree” of specialization based on associated athlete behaviors, habits, and perceptions. Finally, a majority of the studies (52.5%) did not employ a theoretical model in the study design and/or purpose; of those that were theoretically driven, the DMSP (i.e., Côté, 1999; Côté, Baker & Abernethy, 2007) was most common (n = 13).

Furthermore, of this small number of empirical studies, the majority (n = 18) exclusively used elite-level athletes who detailed their experience with sport specialization retrospectively

(e.g., Barynina & Vaitsekhovskii, 1989; Baker, et al., 2005). While these studies illuminate the pathways of athletes who have reached the highest levels, applying these experiences to the larger population of youth athletes is conceptually tenuous. Most youth athletes will not reach the elite level (nor do they realistically intend to), and the validity of athletes reflecting on their experiences after they have already ceased organized youth sport participation creates the threat of a rose-colored lens bias. Additionally, only one study was prospective in nature, with no longitudinal study designs. Sport specialization has been posited as a developmental phenomenon that encompasses the athlete's entire sport trajectory – past, present, and future – making this lack of longitudinal and prospective research concerning (Côté, Baker, & Abernethy, 2007; Horn, 2015).

Through this scoping systematic review of previous research, the common thread of this research is that the athlete tends to be examined in isolation: 35 of the 40 studies (87.5%) use athletes exclusively in their designs, with *zero* studies utilizing multiple stakeholder roles in their design. The far-reaching impact that surrounding social actors and contextual characteristics make on young athletes has been frequently identified, so it is entirely logical that how an athlete structures their time within and between sports would also be sensitive to these external influences.

Because of these noted issues with the data and design of previous research, a clear, consistent conceptualization of participation pathways was highly emphasized in this dissertation study, and several considerations in the methods and target sample were given to aim for an ecologically valid, representative investigation.

Where do we go from here? Reviewing the literature to examine how sport specialization can aid or detract from the holistic growth of youth participants provides little in

terms of concrete, theory-driven, highly replicated findings (Baker, Cobley, & Fraser-Thomas, 2009). Hence, much conjecture and “reading between the lines” is required when attempting to practically apply the results. Therefore, this dissertation’s design aimed to account for these overarching critiques of the previous literature by addressing three major considerations put forth by this systematic review (DiSanti & Erickson, 2019):

- 1) The study took a *developmental* perspective, meaning that rather than viewing specialization as dichotomous and cross-sectional, athletes’ trajectories over the course of their athletic participation were detailed more holistically to encompass their experiences;
- 2) The study took an *ecological* perspective, meaning that rather than viewing the athlete as the sole driver of their sport pathway as an intention-driven “decision,” the impact of their surrounding systems and contextual characteristics were accounted for in this process;
- 3) The study used a *perception-driven* perspective, meaning that rather than viewing the athlete’s participation behaviors as the primary focus of their pathways, this study aimed to explore and outline how athletes read, reacted, and interacted with their surrounding systems throughout their pathway experience to better account for how their underlying attitudes and beliefs influenced their participation habits.

This systematic review was a crucial step in taking stock of the state of the research in this area. Due to the notable lack of theoretically driven empirical designs discovered through the scoping aspect of the review – lacking even more so in the ecological domain – to further analyze these strengths and weaknesses while also accounting for the ecological perspective I hope to permeate my ongoing research, this literature was further critiqued through the filter of Bronfenbrenner’s Person-Process-Context-Time (i.e., “PPCT”) Ecological Model.

Critique of Sport Specialization Literature through the PPCT Ecological Model

In order to examine youth sport specialization effectively from an ecological perspective, it is first important to establish the conceptual framework used to evaluate, critique, and plan the existing and current research: A systems-based, ecological approach to examining human development and social phenomena known as the Person-Process-Context-Time (PPCT) Model (Bronfenbrenner, 1979; Bronfenbrenner, 1986; Bronfenbrenner, 1994; Bronfenbrenner & Morris, 1998). In this section, the major tenets of this ecological framework will be described, and the existing research base of sport specialization will be interpreted through the lens of the PPCT Model while also highlighting notable gaps in understanding.

Sport specialization through the PPCT lens. Thinking most simplistically, Bronfenbrenner posited that conceptualizing a developing individual as an exclusive, self-contained entity is insufficient and counterintuitive when detailing the social world. Rather than existing in a vacuum, individuals are constantly reading, reacting to, and changing their environment as they engage and interact with the various elements of said environment (Bronfenbrenner, 1979; Bronfenbrenner & Ceci, 1994). This person-context interactional approach has been a keystone of Bronfenbrenner's work, and has been utilized previously in examples of sport and exercise research (e.g., Araujo & Davids, 2009; Krebs, 2009).

The PPCT Model illustrates an interdependent web of forces working with and against each other to influence a developing individual's attitudes, behaviors, and interactions within the systems that surround them. The key tenets of this model are shown in a conceptual flow chart below (Figure 2.2):

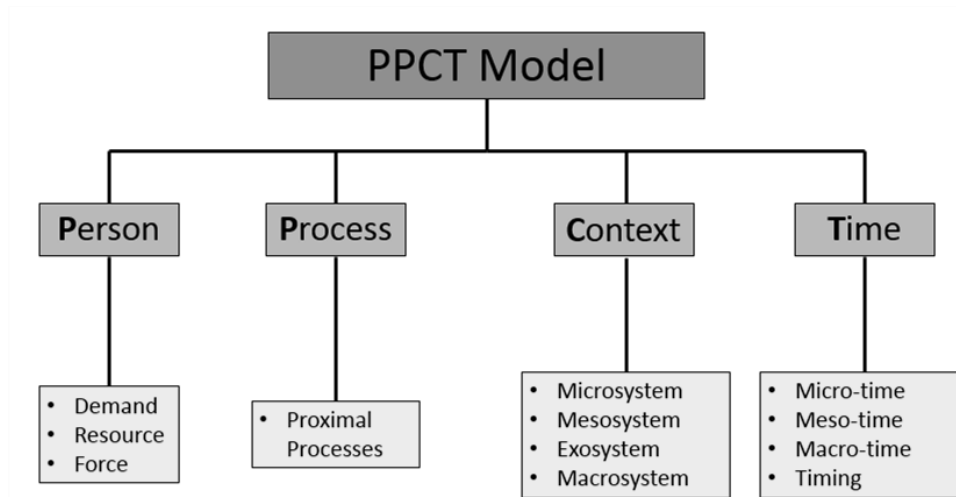


Figure 2.2. Conceptual Flow Chart of PPCT Model

Frequently, sport specialization is posited as an “issue” (e.g., Baker & Robertson-Wilson, 2003; Branta, 2010; Jayanthi, Dugas, Fischer, Pasulka, & LaBella, 2014; Mostafavifar, Best, & Myer, 2013); this makes sense, as the majority of the limited empirical findings in this domain has posited early sampling/late specialization as more adaptive – and with less potential for negative consequences – than early specialization (e.g., Soberlak & Côté, 2003; Baker, Côté, & Deakin, 2005; Jayanthi, Dechert, Durazo, Dugas, & Luke, 2011; Post, Bell, et al., 2017). The aforementioned gap between what athletes *should* be doing according to the academic literature, and what athletes are perceived as *actually* doing in contemporary settings provides a strong impetus for the examination of this topic through alternative, more rigorous means; specifically, thinking more broadly to not only focus on the individual, but also how their existing surrounding systems may influence and guide their perceptions and actions. With such a complex, multifaceted, sociocultural phenomenon as youth sport specialization, ecologically driven inquiry possesses the potential to evolve the literature in a way that could have far-reaching impacts on our understanding and practical recommendations related to youth sport

participation pathways. To this end, the design of this dissertation is informed by the preliminary breakdown of the youth sport specialization literature through the lens of the PPCT Model provided below:

Person. A person-oriented approach involves examining what participants “bring with them” to a given situation and emphasizes the important influence of the individual at the center of the various ecological systems (Bronfenbrenner, 1994; Bronfenbrenner & Morris, 1998). Despite the overwhelming tendency for the accumulated literature to use “athletes” as the primary grouping of participants, when examining the sub-categories in the “person” domain of PPCT, there is a distinct lack of completed work to flesh out this dimension.

Demand. Demand characteristics are the aspects of an individual that prompt an immediate response (whether explicitly or implicitly) from the social world around them. These include demographic characteristics and serve as “stimuli” that invite or discourage frequency and type of interactions (Bronfenbrenner & Morris, 2005). Thinking in relation to youth sport, it is clear how these characteristics would play a role – particularly when considering what we know about the link between coach-expectancy and self-fulfilling prophecy (e.g., Becker & Solomon, 2005).

Though little work has been conducted to examine how demand characteristics influence athletic patterns of participation, this is an area that has shown preliminary development as interest in this topic has escalated. Specifically, age, gender, and nationality/ethnicity have been explored – in that relative order of frequency (DiSanti & Erickson, 2019). Age-related examinations of specialization patterns align with conceptual models for talent development (i.e., Balyi & Hamilton, 2004; Côté, 1999) and seek to answer the frequently posed question of “When should youth athletes specialize?” Multiple studies have shown a positive relationship

between age and sport specialization – meaning that athletes are paring down the number of sports they play, and spending more time invested in their signature sport as they progressively approach the end of their youth sport careers (e.g., Ginsburg et al., 2014; Moesch, Elbe, Hauge, & Wikman, 2011). Additionally, female athletes have been shown to specialize earlier, to a greater degree, and feel greater uncertainty or doubt regarding their decision to specialize than their male counterparts (Barynina & Vaitsekhovskii, 1989; Post, Trigsted, et al., 2017; Stevenson, 1990). Finally, one study found that White American and African American baseball players specialized at a significantly later age than players of other ethnicities (Ginsburg et al., 2014), while another discovered that U.S. basketball players playing professionally in Portugal were more likely to play multiple sports during youth than players of other nationalities (Leite, Santos, Sampaio, & Gomez, 2013).

Though these more demographic-based inquiries into patterns of sport participation have provided a strong foothold for furthering our person-related knowledge, even the limited examples described above fail to fully utilize the nature of the “demand” component of PPCT. These characteristics should be viewed to act *on* the proximal social world to influence how other social actors and institutions interact with these stimulating characteristics. Instead, studies have tended to work in reverse – meaning that the researchers began by examining the outcomes of their participants (i.e., achievement of elite status, age at specialization), and then mapping these experiences retrospectively to the participant’s demographic characteristics (e.g., age, gender, etc.). Study designs such as these shine light on potentially-meaningful links between demand characteristics and associated outcomes, but until individuals’ reactive processes related to the social actors around them are reflected across the course of their development, we are failing to understand how “demand” characteristics play out in the truest sense.

Resource. Next, “resource” characteristics examine the underlying factors a person possesses that aid or hinder development when interacting with “demand” characteristics. These characteristics have been sorely lacking in the sport specialization literature, in which similar resource characteristics are implicitly ascribed to youth athletes or resources attributed retrospectively based on outcome. For example, athletes who have reached “elite status” are often compared to “sub-elite” athletes to examine how their developmental profiles are similar or dissimilar (e.g., Baker, Côté, & Abernethy, 2003; Buckley et al., 2017; Storm, Kristoffer, & Krough, 2012). Though this is a practically convenient way for making comparisons in the broadest sense, there is once again an issue of assumed causality; did the elite athlete reach this degree of success due to the social and cognitive resources they possessed as a developing youth athlete, or might the athlete’s on-field success have led to more attention, recognition, and praise that aided in the development of these resources? Better understanding the nature and directionality of these relationships would help equip athletes with the resources they need to have a successful and enjoyable career, while also optimizing their selection of the appropriate participation pathway.

Force. Finally, force characteristics serve as a conduit between a person’s demand/resource characteristics and their interaction with their larger social sphere. Dispositional and situational factors are both included in this sub-category of “person,” and examples include a person’s motivation (i.e., level and orientation), personality, and interaction style. This is yet another area in which the specialization literature lags behind, once again insinuating that all athletes possess the same “force” characteristics. A logical way in which this element could be employed is to examine athletes’ motivational characteristics in relation to the various pathways of participation; however, only one study has used motivational theory to

frame their study in this manner (Post, Thein-Nissenbaum, et al., 2017; i.e., Self-Determination Theory, Deci & Ryan, 1985). Participant incentives for specializing or sampling throughout their careers have been postulated by sport scientists (Brenner, 2007; Malina, 2010), yet little is known about how this element is perceived or played out practically. Moreover, the lack of studies involving multiple participant roles (i.e., parent-athlete interaction, coach-athlete relationship, etc.) leaves much to be known in terms of how these person-based interactions play out over the course of time. In summary, it seems obvious that the personal characteristics (i.e., demand, resource, and force) of youth athletes impact their sport experience over time; yet, in the majority of completed research in this area, this consideration for personal elements is critically lacking.

Process. Sport specialization – or more broadly, patterns of sport participation – could be viewed as processes in and of themselves. Selection of their respective pathway indicates the participant’s interaction, interpretation, and reaction to the formal and informal structures around them. Based on how the person reads their surrounding culture and landscape, they may then adopt specific training habits aimed towards accomplishing their desired outcomes within this system. However, sport specialization is rarely fleshed out in this manner, as previous literature has assigned a degree of passivity to youth athletes and the various actors involved in this process. This clashes significantly with Bronfenbrenner’s school of thought, which asserts that the “proximal processes” between the individual, the people around them, and the contexts they inhabit are constantly evolving and impacting their experience in an active fashion (Bronfenbrenner, 1994). This overarching theme positions the existing literature precariously in terms of the integrity of ecologically grounded research in this domain.

A consistent theme of the youth sport specialization research has been the dependence on cross-sectional and retrospective designs that provide only a snapshot and/or final evaluation of an athlete's career trajectory, leaving much unknown about the processes of pathway selection and associated participation experiences. When examining athlete patterns of participation, cross-sectional data (e.g., Hall, Barber Foss, Hewett, & Myer, 2015; Leite et al., 2013) provides only a static measurement of participation without accounting for history or future trajectory, while data collection that is retrospective in nature describes an athlete's progression in a cursory fashion with a lack of inferred causation (e.g., Barreiros, Côté, & Fonseca, 2012; Moesch et al., 2011).

Even under the assumption that a retrospective sport history measure accurately reports an athlete's participation pathway, the nuance of how these pathways manifested creates more process-related ambiguity. Studies in this vein have used the terms "Early Samplers" and "Early Specializers" to divide groups by their participation processes. However, there are studies that call into question the dichotomy of "early specializers" vs. "early samplers" as sufficient means for grouping athletic patterns of participation (e.g., Barynina & Vaitsekhovskii, 1989; Storm et al., 2012). Additional research questions in this ilk include how long or how often an athlete has trained (e.g., Moesch et al., 2011; Post, Trigsted, et al., 2017), or when they transitioned from multi-sport to single-sport participation (e.g., Gitonga, Bailasha, & Toriola, 2011; Russell, 2014). Overall, the tendency to study participation processes through "broad strokes" imaging has provided little depth of understanding of actual athletic experiences, failing to describe the "proximal processes" that so importantly *do* illustrate these experiences (Tudge et al., 1997).

According to proponents of PPCT, though this model is multifaceted and involves many sub-dimensions, none is more important than understanding the "proximal processes" that link

individuals to each other and their surrounding systems (Tudge et al., 2009). Unfortunately, this disqualifies nearly all specialization research from being considered effective in using this theory. This lack of process-based research becomes even more troubling when thinking through the very likely impactful nature of the emphasized proximal processes: The day-to-day and prolonged interactions an individual has with their peers, parents, coaches, and others would be reasonably expected to shape their beliefs and sport experience significantly. Additionally, all members of this social equation have their own views and attitudes regarding their context and would thus be reacting both to each other and their environment. These attitudes would then impact manifested participation habits and the status quo, which in turn would call for a subsequent re-evaluation and interpretation of specialization-related attitudes stemming from the changing reality of their context. However, little is known regarding how the interaction of stakeholders in a youth athlete's support system impact their sport participation pathways: Research in this area has largely used athletes as the only participant group, while studies examining multiple sport roles simultaneously (e.g., parents, coaches, peers) are lacking (DiSanti & Erickson, 2019). This cyclical, reciprocal relationship between sport stakeholders likely leads to the evolution of the individual and their surrounding systems as they constantly interact and progress over time, illustrating why examining any of these aspects in isolation – without accounting for the proximal processes that link them – is insufficient and conceptually tenuous.

A related area from the literature that adjacently addresses this process-based interplay between youth sport stakeholders and their environment examines attitudes and perceptions regarding youth sport specialization. Several studies have demonstrated the belief by youth sport stakeholders that specializing is more likely to lead to elite status attainment than continued sampling (Buckley et al., 2017; Ginsburg et al., 2014; Hill & Hansen, 1987; Swindell et al.,

2019), as well as the belief that the prevalence of specializing is increasing (e.g., Hill & Simons, 1989; Russell & Symonds, 2015). Though this work is once again limited, these attitudes provide a process-centered explanation for the earlier-cited gap between recommendations and perceived behaviors: If youth sport stakeholders believe that specializing is more likely to lead to elite performance and that their competitors are likely to specialize, it makes logical sense that they would be coaxed into this pattern of participation as well.

Furthering this notion is a unique study related to specialization in the growth and motor domain. When examining developing youth athletes over the course of several years, Fransen and colleagues (2012) found that multisport participants initially lagged behind early specializers in markers of explosive strength and gross motor coordination before age 10; however, this effect was flipped in ages 10-12, with early samplers demonstrating advantages in explosive strength, speed and agility, cardiovascular health, and gross motor coordination compared to early specializers. If a cross-sectional or retrospective measure were used to explore this topic, we would fail to see the interesting process that is occurring; namely, that the initial advantage possessed by early specializers clashes with the guiding recommendations for structuring pathways of participation (Côté, Horton, MacDonald, & Wilkes, 2009; Côté et al., 2009; LaPrade et al., 2014). In turn, athletes who are worried about falling behind or who may lose enjoyment due to a lesser degree of success may consider specializing to “keep up” with their peers (Malina, 2010). However, if they adopt this pattern before they can experience the apparent latent advantages of early sampling of multiple sports, they would retrospectively be grouped as an “early specializing, non-elite athlete.” In this example, it is the process – not the athlete’s experience as a whole – that most accurately illustrates their participation pathway.

The preceding study is certainly a rarity in the sport specialization literature; the lack of longitudinal and prospective studies greatly limits the ability to make empirically backed, well-interpreted recommendations for structuring youth athletes' participation. One of the most heralded findings of the youth sport specialization literature is that most elite athletes do *not* specialize exclusively in one sport at an early age (e.g., Coutinho, Mesquita, & Fonseca, 2016; Leite, Baker, & Sampaio, 2009; Ginsburg et al., 2014), and many maintain multi-sport participation throughout their high school careers (Buckley et al., 2017; Post, Thein-Nissenbaum, et al., 2017; Swindell et al., 2019). Here we can see the problem in failing to account for the process – yes, elite athletes have been able to maintain multi-sport participation while also achieving superior performance in their “signature” sport; however, is their multi-sport participation leading to their superior performance in their “signature” sport, or is their superior performance leading to their ability to play multiple sports? Thinking practically, in sport systems with strong selection processes (e.g., try-outs) it seems likely that a star athlete might have concessions made or flexibility allowed to play for multiple teams, whereas a more middling athlete may be coerced (explicitly or implicitly) to choose a single sport in order to avoid missing out on the opportunity to participate in at least one sport. Often, commentary related to patterns of participation frame multi-sport participation as a cause or antecedent of elite talent development, when in fact the lack of process-based research leaves little evidence to support this claim.

Context. An understanding of contextual influences has also been underdeveloped in the case of youth sport specialization. As mentioned in the “person” section, participants in the evolving literature base are often treated uniformly and devoid of demographic or personal characteristics; this feature extends to context as well, in which very little description – let alone

explicit inclusion in guiding research aims or purposes – has been given to the contextual element of PPCT. Below, the four systems comprising the “context” component of the PPCT Model are examined in relation to existing and future sport specialization research.

Microsystem. The first context-based system of PPCT relates to the immediate local environment in which the person’s experience primarily takes place: their microsystem. This level is comprised of both people (e.g., peer group, team, parents, coaches) and physical settings (e.g., practice facilities, at home in the backyard, school, etc.). Even though this system exists most proximally to the developing youth athlete, the youth sport specialization literature has largely failed to detail the athletic microsystem. Peers, coaches, and available (local) resources are largely impactful factors in shaping an athlete’s experience – in accordance with the PPCT’s focus on “proximal” processes (Bronfenbrenner, & Morris, 1998; Tudge et al., 2009) – yet these factors have gone mostly unexamined in the sport specialization literature. For example, no study has examined the impact of community characteristics (e.g., available facilities, community safety, public transportation availability, etc.) in conjunction with patterns of participation. This is yet another problematic blindspot in the youth sport specialization literature; how can we recommend behaviors without accounting for practical considerations of an athlete’s proximal environment that may significantly influence the viability of undertaking these behaviors?

Mesosystem. Next, the mesosystem describes the interrelated nature of the various contextual characteristics involved in the microsystem. Perhaps the most blatant lack of understanding regarding the mesosystem is how the various roles of youth sport interact to influence patterns of participation. Often, parents or coaches are posited as the critical drivers of pathway selection (e.g., Coakley, 2010; Malina, 2010); however, no empirical study of youth sport specialization has examined multiple stakeholders concurrently, which casts doubt onto the

implicit assumptions of other-stakeholder influence. Additionally, exploration of athletes' experiences across multiple microsystems concurrently (e.g., high school vs. club sports; community vs. travel teams) is another example of a critically lacking area of understanding regarding the athlete's mesosystem.

Exosystem. Continuing to move outwardly through the contextual systems of the PPCT Model, the “exosystem” comprises the larger system in which the micro- and meso-systems are situated that exert indirect influences on these systems. This system is slightly more difficult to define in the context of youth sport participation, as fully encompassing the potential influences that work in an interactive fashion at this level could prove to be an endless task. However, a few ideas for how this system could be employed include larger community characteristics that are non-sport related (e.g., community resources, attitudes, other extracurricular activities, relative wealth & income distribution, etc.) or influences of national guiding organizations (e.g., NFHS, Little League Baseball/Softball, AAU, etc.). Two research questions that begin to approach the exosystem include how an area's temperate climate impacts specialization habits (i.e., athletes in warmer climates tend to specialize earlier (Ginsburg et al., 2014)), and how school size impacts patterns of participation (i.e., larger school size associated with more specialized participation, (Bell et al., 2016)). Though further explanation is needed to understand the exosystem characteristics that impact youth sport participation patterns, researchers can be diligent to address indirect contextual elements in as much detail as possible at this level, while also taking note of limitations by which they fail to account for this systemic level in their research designs.

Macrosystem. The final and most distal contextual system to the individual of the PPCT Model is that of the macrosystem; this includes cultural beliefs, values, and attitudes related to youth sport specialization. As mentioned earlier, understanding attitudes and perceptions of the

utility and prevalence of specialization provides a window into how pathways play out over time; this works on a local level, but should also be considered at a regional, national, and cultural level. In recent years, sport researchers have noted a shift to a more “professionalized” atmosphere of youth sport (e.g., greater investment of time and resources, highly competitive climate, fewer opportunities for free play and recreation) (Coakley, 2010; Malina, 2010; Smith, 2015) that may increase an athlete’s propensity to specialize, but these attitudes have yet to be fully fleshed out through empirical examination. Using large samples (e.g., Bell et al., 2016; Buckley et al., 2017; Post, Trigsted, et al., 2017) and including qualitative, more perception-based data (e.g., Barynina & Vaitsekhovskii, 1989; Storm et al., 2012) help to link attitudes to behaviors, and also may lead to a reconceptualization of our recommendations if they do not practically align with the current sport landscape.

In summary, it is clearly tenuous to make guiding recommendations for sport participation without accounting for contextual characteristics. The field has shown encouraging development in this capacity over recent years (e.g., Bell et al., 2016; Ginsburg et al., 2014), and continuing to critically analyze the proverbial “playing board” on which athletes are competing (and thus the larger social/societal forces acting on them) will help gain a better understanding of the behaviors they adopt to navigate this terrain.

Time. Finally, time has been an insufficiently explored aspect of the youth sport specialization equation. It is highly intuitive to frame the allocation of sport participation within and between sports as more than a static choice happening at a single timepoint; rather, this is likely an evolving decision and conversation among the various social roles involved with shaping the youth athlete’s experience and participation behaviors. Support for the examination of youth sport specialization as a developmental phenomenon has been provided frequently from

key academics in this area (e.g., Côté et al., 2003; Horn, 2015). However, when breaking down the specifics of how “time” has been used in the methods and designs of previous literature, it appears that these characteristics have been misaligned with this developmental, temporally based approach.

Most notably, the vast majority of empirical studies in this domain have examined athlete participation behaviors retrospectively; while this may help clear several practical hurdles (i.e., access to participants, parent consent, etc.), the validity of these studies relies heavily on the integrity of athletes’ memories and reflective interpretation of their experiences – characteristics that leave much to be desired in terms of accurately detailing and applying the results to the real-time experiences of currently-competing athletes. As mentioned previously, the duration and sequencing of events also plays an important role in the “time” aspect of the PPCT Model. This is highly relevant to sport specialization, and the “duration” aspect has been leaned on to a greater extent than the “sequencing” aspect (e.g., Post, Trigsted, et al., 2017). Though developmental models (i.e., the Developmental Model of Sport Participation, Long-Term Athlete Developmental Model) provide a tentative structure for duration and sequencing of youth athletes’ participation, little research has utilized these sequences properly from a PPCT perspective:

Micro-time. Similar to the “microsystem” aspect of the context domain, “micro-time” relates to the time component most closely related to the individual. Though there are methodological challenges in examining the moment-to-moment experiences of youth athletes, interactions at this level (e.g., success in a drill or activity, coach feedback, time spent in an individual practice or competition) are indicative of proximal processes that may influence perceptions and outcomes across a larger timeframe. Therefore, while it is difficult to infer the

developmental impact of these short-term interactions, accounting for micro-time influences in research may also present a fruitful avenue for enhancing understanding of the phenomenon of youth sport specialization.

Meso-time. Next, meso-time describes the “extent to which activities and interactions occur with some consistency in the developing person’s environment” (Tudge et al., 2009). This level can be taken in conjunction with the micro-system to approach important questions regarding specialization: what are temporally based frequencies of participation (both within and between sports)? How does the individual athlete split their time between contexts (e.g., community/recreational vs. club/elite)? How much time do they spend over a season training and travelling? In terms of existing literature, training hours of elite athletes have been surveyed in the talent development domain (Law, Côté, & Ericsson, 2007; Moesch et al., 2011), but this level has failed to be incorporated in research of youth sport specialization to a sufficient degree. Specifically, using a pathway/trajectory-based approach would much more effectively serve to match meso-time factors to overall development over time.

Macro-time. Macro-time is the most distal element of time in PPCT, comprised of the developmental influences which have indirect effects on the individual, or occur at a certain point in the individual’s life (Tudge et al., 2009). The only empirical studies that could be said to account for macro-time in this literature are the handful of studies ($n = 6$) that examine athletes from multiple levels of competition concurrently (e.g., Baker et al., 2005; Buckley et al., 2017; Russell & Symonds, 2015). In theory, this would include the larger degree of macro-time in which each athlete is currently competing; for example, an athlete competing in the 1990s might favor early specialization because of the successful examples of the early-specializing Tiger Woods (golf) and the Williams sisters (tennis); however, an athlete growing up in today’s culture

may be more exposed to messaging that promotes multisport participation. The societal attitudes that define these two timepoints largely influence the manifestation of the athlete's pathway selection, which is accompanied by associated implications. Taking periodic stock of societal attitudes and beliefs regarding youth sport patterns of participation would have far-reaching impact in addressing elements of the PPCT Model, and specifically would enhance the “meso-time” component of literature.

Timing. Lastly, the element of timing is important to understanding specialization through the PPCT Model. Several studies have approached this topic through examining *when* athletes specialize; overall, findings indicate that elite athletes specialize later than their sub-elite comparison groups (e.g., Baker et al., 2005; Livingston et al., 2016), and that they spend increased time in specialized participation as they age (Moesch et al., 2011; Wall & Côté, 2007). Though these are useful studies even when conducted through a retrospective lens, the measures of “specialization” are often very simple, dichotomous, and fail to address the full scope of timing (Barynina & Vaitsekhovskii, 1989; Storm et al., 2012). For example, understanding how patterns of behaviors are sequenced (e.g., when do multiple sports overlap? How much time is there between seasons? When an athlete plays for multiple teams in the same sport, how are these seasons timed?) is a vital next step in the literature. Once again, providing detailed participation description that accounts for past, current, and future sport participation would aid greatly in this endeavor.

Bronfenbrenner's Ecological Systems Theory provides an excellent conceptual foundation for conducting high-integrity, well-rounded, practically informed research; however, it is important to recognize that accounting for *all* tenets of this model effectively is somewhat idealistic. Research in youth sport – and to an even greater extent, when examining the sub-topic

of youth sport specialization – presents a wide variety of challenges that directly threaten the ability to effectively employ ecologically-focused designs. Small sample sizes and lack of access make examination of multiple contexts difficult; participant attrition and logistical concerns make longitudinal designs challenging to carry out; lack of clear definition for the construct of “sport specialization” provide a murky understanding of the “process” elements of youth sport, to name just a few of these concerns.

This thorough breakdown of the sport specialization literature through the lens of Bronfenbrenner’s PPCT Model provides a clear conclusion: In examining sport specialization from a practical, ecological perspective, there is still much left to be done. To this end, the preliminary work I have conducted at MSU has sought to address some of these concerns, and based on the findings of these studies – and through critical analysis their conceptual shortcomings in the ecological domain – this dissertation aimed to take a significant next step in the push for sport specialization research better aligned with the tenets of the PPCT Model.

Youth Sport Specialization Perception Scale

After this two-part thorough review of the youth sport specialization literature through the multidisciplinary scoping systematic review and critique of the literature through the lens of the PPCT Model, my empirical work began to strategically explore the identified gaps and underexamined characteristics of this literature. First, due to the notable dearth of perception-based empirical research and the absence of instruments to facilitate these designs, the first step of my empirical work was to construct and validate the Youth Sport Specialization Perceptions Scale (i.e., the “YSSPS”). Initiating from my master’s thesis work (DiSanti, Chase, Vealey, & Horn, 2016) this revised scale was designed to globally quantify how sport stakeholders perceive important elements related to sport specialization in a positive or negative fashion. Participants

rated each of the 25 items (e.g., “All athletes should specialize in one sport by the time they reach high school”), on a Likert-type scale ranging from 1 (strongly disagree) - 4 (strongly agree), such that *higher* ratings indicate a *more favorable* attitude regarding sport specialization. This scale was validated with a group of 948 current undergraduates who were former athletes (49% male, 51% female; *M* age = 20.75 years old) as a reliable global measure of youth sport specialization, with a Cronbach’s alpha coefficient of .87.

Qualitative Thematic Analysis of Sport Participation Pathways

In addition to the quantitative items used to validate the YSSPS, this exploratory testing battery also included open-ended response items which detailed the participant’s history of sport involvement (DiSanti, Wright, Chase, & Erickson, under review). More specifically, the participant retrospectively outlined their longitudinal sport pathway, while also describing why they opted to specialize or play multiple sports across their participation. Before interpreting the results of this study, the guiding framework provided by the Developmental Model of Sport Participation (DMSP) must first be reviewed.

Developmental Model of Sport Participation (DMSP). This model (Côté, 1999; Côté, Baker, & Abernethy, 2003) is a vital to both this qualitative study of sport pathways as well as the framing of the dissertation as a whole due to its stage-based progression of structuring athlete participation, its explicit inclusion of the element of “specializing” in one sport vs. “diversifying” in another, and the pervasive use of this model in related literature (DiSanti & Erickson, 2019). Additionally, the three stages outlined by the DMSP are associated with certain “styles” of play/competition that are aimed at breeding a sustained sense of enjoyment, accomplishment, and relatedness across the athletic lifespan.

In Stage 1 – the Sampling Years – athletes are recommended to begin by trying a wide

variety of sports with a primary focus of fun and enjoyment to build basic skills and a positive psychosocial foundation (approximate age range: 6-12 years old). Next, during the Specializing Years (ages 13-15), athletes begin to gradually pare down the number of sports they play while focusing on developing sport-specific skills in the sports they enjoy most and possess the most talent. During this time athletes may also continue a diverse sampling of multiple sports if they are less interested in elite status attainment. Finally, the Investment Years take place between ages 15-18 (the latter stages of most athletes' careers), in which athletes are suggested to invest in either the pursuit of expertise in a single-sport, or continued recreational multisport participation (Côté, 1999; Côté et al., 2003). It is also noteworthy that the approximate age recommendations for progressing through the stages of this model align nicely with the U.S. education system (i.e., Stage 1 = Elementary School; Stage 2 = Middle School; Stage 3 = High School). Therefore, these three salient markers of sport participation can be useful in data collection; by answering whether they specialized (or plan to specialize) during each of these three time points, athletes create a theoretically grounded “pathway” of their previous and projected sport participation. More specifically, previous work with the DMSP has identified three pathways of youth sport participation (shown below in Figure 2.3):

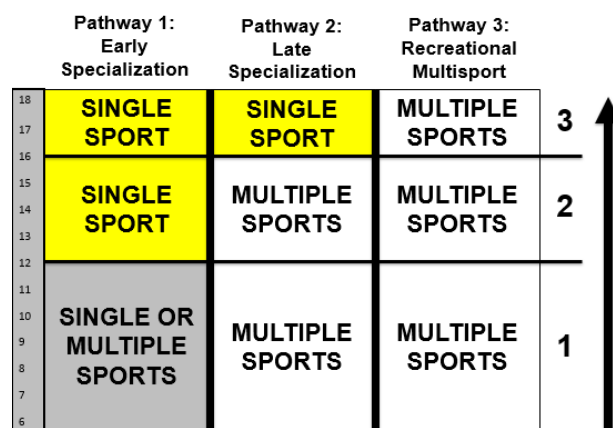


Figure 2.3. DMSP Pathways: Specialization Status Across Development

The DMSP labels pathways one and two (i.e., Early Specializers or “ES” and Late Specializers or “LS”) as pathways undertaken by elite-striving athletes, while pathway three (i.e., Recreational Multisport or “RM”) is better suited for those who seek more recreational and less performance-based outcomes (Côté, 1999; Côté, Lidor, & Hackfort, 2009). In terms of the developmental appropriateness of each pathway, the DMSP posits pathway two (i.e., LS) as most adaptive for elite-striving athletes, pathway three (i.e., RM) as most adaptive for non-elite athletes, and pathway one (i.e., ES) as maladaptive in a psychosocial sense regardless of an athlete’s ultimate goals. Though alternative pathway trajectories are also possible through data collection of participation at these three timepoints (i.e., increasing participation throughout, fluctuating participation between time points), these alternative pathways have not been detailed in the existing literature, and thus were de-emphasized in this qualitative study.

Results of qualitative thematic analysis. Participants retrospectively reported their sport participation pathway over the course of three time points: 1) Early Youth Sport (before Middle School); 2) During Middle School; 3) During High School. For each of the three selected time points, each athlete was asked: 1) Did you specialize in one sport during this time period? 2) Why or why not? Based on the athletes’ responses to these two simple questions, they were grouped into one of the pathways informed by the DMSP previously mentioned. The frequency and proportion for each respective pathway was as follows: 1) Early Specializers (n = 84, 7.8%); 2) Late Specializers (n = 356, 33.2%); 3) Multisport Recreational (n = 421, 44.4%), and 4) Non-typical Pattern (n = 87, 9.2%). After sorting each athlete into one of the four groups via their responses to question #1 (“did you specialize”), their open-ended responses to question #2 (“why or why not”) were then examined to better understand their decision-making process. Their answers illuminated three novel higher-order themes that guided each athlete’s decision to play

one vs. multiple sports during their careers: Ability, affect, and agency. To clarify, “ability” related to the athlete’s perception of their talent and performance within their signature sport, “affect” demonstrated elements of enjoyment, fun, and passion associated with playing their signature sport, and “agency” described the athlete’s perception of the selection of their single or multiple-sport pathways being within or outside of their control. These three themes provided a novel heuristic for understanding how an athlete’s perceptions of their individual characteristics guide their pathway selection process, thus providing a practically valid set of individual variables as well as a method of grouping participants for this dissertation study.

Comparing High School & Club Coach Perceptions of Sport Specialization

The final step in my preliminary research to build into this dissertation study provided strong rationale for using an ecological approach when studying athlete participation pathways. As noted in the summaries of the systematic review and PPCT literature critique sections, there is a budding basis of support that in terms of sport specialization, *context* matters and *perceptions* matter (Bell et al., 2016; DiSanti & Erickson, in review). As discussed previously, an oft-mentioned trend in contemporary youth sport is a more “professionalized” climate symptomized by increased pressure to perform, high demand for investment of time and money, and decreased emphasis on fun (Matz, 2014; Vealey & Chase, 2015). One contextual characteristic that has been conceptually linked to this professionalization is that of club sports. In a large sample of high school or club basketball, volleyball, and soccer coaches, it was found that club coaches ratings of their perceptions of specialization (measured via the YSSPS; DiSanti, Chase, Vealey, & Horn, 2016) were significantly more positive than high school coaches. No significant multiple linear regression equation was reached when accounting for coach background characteristics (e.g., coach education, coach education, secondary education, etc.), indicating that

the sport context itself (i.e., club vs. high school) was the most salient influencer of how coaches view specialization (DiSanti, Post, Bell, Schaefer, Brooks, McGuine, & Erickson, accepted April, 2019). This is important foundational work for the proposed study, as it emphasizes the importance of examining characteristics of the athlete's *system* to better understand their pathway selection while also clarifying that attitudes and messaging related to specializing may differ based on contextual factors.

From summarizing this literature and previous research, it becomes clear that only a small slice of the full picture of athlete participation patterns regarding specialization has been examined – in terms of sample selection, methodology, and practical significance. The current study is designed to purposefully address these gaps through efficient measures that better link participation pathways to developmental sport experiences through an ecological lens.

The Current Study

Though it is logically impractical for a single study to account for *all* aspects of an athlete's ecology simultaneously across development, based on the thorough and continued review of the youth sport specialization literature and my ongoing research line, this study employed a novel exploratory conceptual heuristic aimed to better illustrate and associate variables involved in an athlete's sport pathway experience. Through interpreting my previous work, I have conceptually situated three categories of factors into a simple working framework of youth sport pathways (illustrated below in Figure 2.4): 1) Ecological Factors; 2) Specialization Factors; 3) Experiential Factors:



Figure 2.4. Conceptual Diagram of Factor Categories

These three categories were then further operationalized into two factors apiece based on my review and interpretation of the literature and previous empirical work: For Ecological Factors, these were divided into “individual characteristics” (i.e., ability, affect, and agency; emerging themes from DiSanti, Wright, Chase, & Erickson, under review) and “contextual characteristics” (i.e., school size, sport gender, signature sport type), which were trends from the “contextual considerations” section of the systematic review (DiSanti & Erickson, 2019). The Specialization Factors were further broken down into “Participation Pathway” (DMSP-oriented pathways from DiSanti, Wright, Chase, & Erickson, under review) and “Perceptions of Specialization” (measured via the YSSPS; DiSanti, Chase, Vealey, & Horn, 2016). Finally, Experiential Factors were separated into “Pathway Expectations” (i.e., expectation for sport enjoyment, expectation for social enjoyment, expectation for performance success) and “Pathway Experiences” (i.e., perceived pathway satisfaction, perceived pathway enjoyment, perceived sport competence, and burnout) based on the assumptions of the DMSP (Côté, 1999; Côté et al., 2003) and subsequent empirical work detailing the psychosocial and performance outcomes of sport participation pathways (DiSanti & Erickson, 2019). This proposed ecological conceptual framework is illustrated in Figure 2.5 and will be detailed in further depth in Chapter III in regard to its operationalization and measurement in this study.

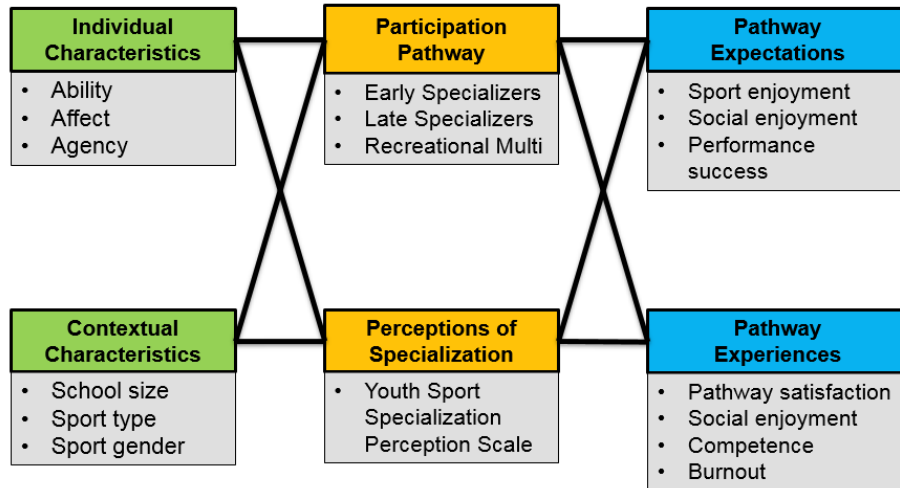


Figure 2.5. Proposed Ecological Conceptual Framework of Sport Participation Pathways

CHAPTER III: METHODS

Participants

The sample of this study was comprised of 132 currently competing high school student-athletes (40.6% male, 59.4% female; *M* age = 15.71 years old; *M* sports played during participation pathway = 3.08 sports; *M* sports currently playing = 1.96 sports), coming from 10 different teams at 7 different schools. Though recruitment of participants aimed to diversify participants' characteristics by their gender, ethnicity, sport, and community characteristics, based on participant response rate and geographic limitations convenience sampling of personal contact lists and partnering organizations (i.e., the Michigan High School Athletic Association's Multi-Sport Task Force) were also employed. To be included in this study participants were required to be an active member of at least one high school sport team during the 2018-2019 school year; no additional exclusion criteria were used in order to maximize the quantity and diversity of the athletes comprising this sample.

Procedure

Prior to data collection, the testing protocol was approved by the Michigan State University Institutional Review Board for Research with Human Subjects – a copy of the IRB approval letter is included as Appendix A. Participant recruitment occurred via e-mail and phone contacts provided by accumulated internal contact lists, as well as those of partner organizations (i.e., Michigan High School Athletic Association). Athletic directors and coaches served as the point-of-contact in recruitment; after these stakeholders indicated interest in involving their student-athletes in the study, the researcher followed up to make arrangements for a time of data collection that was convenient for these interested participants. IRB approved forms for participant assent and parental consent (for those under 18 years of age) or just participant

consent (for those over 18 years of age) were distributed to potential student-athlete participants prior to the scheduled time of data collection either manually by the lead researcher, or via the athletic director or coach serving as the point-of-contact. The consent form and e-mail recruitment script were explicit in regard to the voluntary nature of study participation, and all people involved in this study were provided the option of contacting the lead researcher with any questions or concerns regarding the study. The participant assent/consent form also provided the participant with the option of indicating their interest in receiving a summary report of this study's findings, as well as their interest in being contacted for further research.

At the scheduled time of data collection, the researcher travelled to sport sites (e.g., practices, training session, athlete meetings) to administer the testing battery. Though there was no precise measure of each participant's duration of study participation, it is estimated that each participant took approximately 15-20 minutes to complete the testing battery. Once completed, each participant was given a debriefing form which provided them with information on the study and contact information for any further inquiries. The hard copy of each participant's responses was stored in a locked file cabinet in the primary researcher's office, and their results were imported electronically to the lead researcher's password-protected laptop and copied to a secured on-line database. Participants did not receive any financial compensation for their completion of the study, though participating teams were offered a complementary mental performance consultation session by the lead researcher, and three teams did opt to receive this token of gratitude.

The procedure through the survey battery aimed to flow logically through the various elements identified in the proposed conceptual framework, while aiming to create clear comprehension of the constructs of interest by the athletes throughout their participation. When

selecting measures to comprise the testing battery, previously validated measures employed in the youth sport literature were utilized whenever possible; however, due to the unique nature of several constructs in this proposed model, measures were adapted or created when necessary, and a concise approach for measuring variables was used whenever appropriate to minimize participant burden.

Athletes began by completing a sport participation questionnaire, priming their memory of their sport participation pathways and allowing them to identify their “signature sport” (i.e., the sport they would choose to play if they had to quit all others and commit to just one) for the remainder of the testing battery. This questionnaire also surveyed categorical variables related to their contextual characteristics (i.e., school size and sport gender), and sport background and demographic information not included in the variables of this conceptual framework (i.e., age, year in school, # of sports played, # of sports currently playing). The remainder of the testing packet involved measures coinciding with the remaining variables of the proposed ecological conceptual framework. A complete summary of the testing battery’s ordering and characteristics is provided as Appendix B, while a copy of the full testing battery is included as Appendix C.

Proposed Ecological Framework of Sport Participation Pathways

As described in Figures 3.1 & 3.2, the variables included in this proposed conceptual framework are grouped into three major categories with two sub-classifications each: 1) Ecological Factors (Individual characteristics, ecological characteristics); 2) Specialization Factors (Participation pathway, perceptions of sport specialization); and 3) Experiential Factors (Pathway expectations, pathway experiences). In order to expand these three conceptual groupings into an operationalized ecological framework, each measured variable is further detailed in the subsequent section.

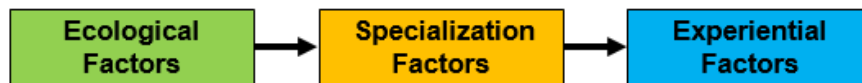


Figure 3.1. Conceptual Diagram of Factor Categories

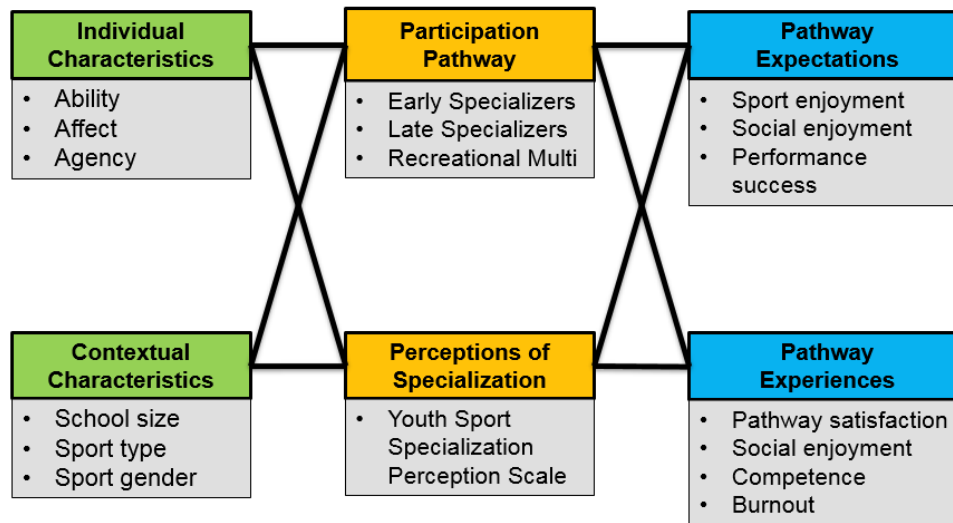


Figure 3.2. Proposed Ecological Conceptual Framework of Sport Participation Pathways

Variables

Individual characteristics. Variables included in this group arose from the author's qualitative analysis of former high school athletes' open-ended responses regarding their participation pathway selection, and are viewed as meaningfully related to the specialization-related behaviors and perceptions.

Ability. To explore each athlete's dispositional (i.e., across their participation pathway) perception of ability in their signature sport, the Trait Sport Confidence Inventory (Vealey, 1985) was employed. This measure is viewed as an appropriate proxy measure for the construct of *perceived* ability in the scope of this study due to its conceptualization of confidence as a relatively stable, individual perception of an athlete's ability to succeed in their signature sport,

while also accounting for the athlete's perception of their own ability in comparison to other athletes (Vealey, 1985). This measure is comprised of 13 items (e.g., "Compare your confidence in your ability to perform under pressure to the most confident athlete you know), scored on a 9-point Likert scale (1 = lowest confidence, 9 = highest confidence). No items in this scale are reverse-scored, and this variable was treated as an interval scale in analyses using the participant's mean-rating of the 13 items; Cronbach's alpha reliability coefficient for this scale in the current sample was .93.

Affect. The next variable identified as an individual characteristic is that of affect. This variable relates to the affective experience athletes associate with their signature sport, as well as the feelings they associate with competing alternatives. This construct is differentiated from previously validated sport measures in that it does not seek to quantify *sources* of enjoyment (i.e., the Sources of Sport Enjoyment Questionnaire, Wiersma, 2001), but the athlete's comparison of the affect they associate with their signature sport relative to potential alternatives. Therefore, the single item designed to measure this construct was "In comparison to other sports, how much do you like your signature sport?" Potential ratings of this item ranged from 1-5 (i.e., 1 = much less, 2 = a little less; 3 = about the same; 4 = a little more; 5 = much more); this scale included a meaningful midpoint so that the participant can reflect an equal affective experience between their signature sport and secondary sport alternatives if this perception exists. This single item rating was treated as continuous in analyzing affect with other model variables.

Agency. The final individual factor is that of agency; this denotes the athlete's perception of their selection of single vs. multiple sports being within or outside of their own volition. This construct is viewed as novel and differentiated from previous measures of control in sport and exercise (e.g., perceived autonomy) due to its very specific relation to the athlete's agency of

their pathway trajectory, rather than the general climate in which they participate. To frame this perception of control (or lack thereof) in a developmental and ecological fashion consistent with this study, the stem of “Over the course of your sport participation, to what degree was your pathway...” was used for three items that detailed their individual influence (i.e., “within your control”), the influence of other people (i.e., “influenced by the people around you (such as your parents, siblings, friends, coaches, etc.)”), as well as their surrounding sport environment (i.e., “influenced by your environment”). This resulted in a 3-item measure designed for this study in which participants rated each item on a 1-4 Likert scale (i.e., 1 = not at all, 4 = very much). The items related to the athlete’s surrounding social actors and perceived characteristics of their environment were reverse scored so that higher mean ratings indicated a high degree of internal control and low external control in the pathway selection process, while lower mean scores indicated a high degree of external control and low degree of internal control in the pathway selection process.

Contextual characteristics. While the variables identified below have been identified in previous research as meaningfully correlated with athlete participation pathways, a novel aspect of this study is the exploration of the interrelation of these constructs within the proposed conceptual framework. Therefore, these three categorical variables served as a basis of meaningful between-group analyses throughout the study.

School size. One characteristic of an athlete’s environment that has been consistently found to influence their specialization habits is the size of their school. Therefore, participants indicated their school’s classification within the Michigan High School Athletic Association (i.e., A-D, A = largest, D = smallest) or Pennsylvania Interscholastic Athletic Association (AAAA = largest; A = smallest) on the sport participation questionnaire.

Signature sport type. Another important contextual variable in the pathway selection process is the sport the athlete perceives to be their “signature sport.” More specifically, sports in which athletes compete individually have shown an increased likelihood of specialization, so the individual vs. team nature of sport competition was examined in this model. As previously mentioned, this term was operationally identified by asking the participant “if you had to quit all sports and only play one, which sport would you choose?” In the testing protocol, the participant provided their signature sport via one open-ended item. Prior to data analysis, a complete list of provided responses was catalogued, and the individual vs. team nature of each sport was determined via the primary researcher and the research team and recoded for further data analysis.

Sport gender. This contextual variable relates to the classification of the athlete’s signature sport as male or female. This construct was treated dichotomously in the current study, and participants indicated their sport’s gender classification in a single item in the sport participation questionnaire. It should again be noted that for this study, sport gender was viewed as a salient influencer of the competitive context rather than an individual characteristic, resulting in its classification as a contextual factor in the conceptual framework.

Participation pathway. In accordance with the use of the DMSP as the guiding framework of this study, athlete participation pathways were a critical grouping criterion of examination. This variable used three time periods (i.e., during Elementary School, Middle School, and High School) to outline the athlete’s participation status across their development and used their individual trajectory to demarcate their longitudinal sport participation pathway. To define each pathway, athletes were asked “did you specialize” (yes/no) during elementary school, middle school, and high school sport participation. This series of questions was framed

through defining specialization in the testing measure as “training and competing in a single sport for more than 8 months a year, while excluding other potential sport options” (adopted from LaPrade et al., 2016). Based on these athletes’ “yes/no” responses across the three levels and in conjunction with the pathways outlined conceptually via the DMSP, the three main groupings for this study were defined as follows:

Table 3.1.
Specialization Status of Operational Pathways Across Development

Pathway	Specialized in one sport during...		
	<i>Early Youth Sport</i>	<i>Middle School Sport</i>	<i>High School Sport</i>
<i>1) Early Specializers</i>	Yes or No	Yes	Yes
<i>2) Late Specializers</i>	No	No	Yes
<i>3) Recreational Multisport</i>	No	No	No

Though it could be argued that the pathways move from more to less specialized from Pathway 1 (ES) to Pathway 3 (RM), because the DMSP posits these pathways as complex, multifaceted experiences for youth athletes, in this study this variable was treated as categorical in data analysis.

Perceptions of sport specialization. A unique element of this study was that participants not only provided information regarding *what* they did across their sport participation, but also *how* they perceived these trajectories. The Youth Sport Specialization Perception Scale (YSSPS; DiSanti, Chase, Vealey, & Horn 2016) was used to measure this variable in this study. The YSSPS is a reliable scale (Cronbach’s alpha coefficient of .87) that globally quantifies participants’ perceptions (i.e., attitudes, beliefs, values) of important elements related to sport specialization in a positive or negative fashion. Athletes rate each of these 25 perception-based items (e.g., “specializing makes sense for talented athletes who want to participate at higher

levels”) on a 4-point Likert-type scale (i.e., 1 = strongly disagree – 4 = strongly agree). In order to present a more balanced tone regarding specialization, 10 items in this scale use wording that prompts athletes to rate items related to multisport participation – these items were reverse scored when examining the participant’s mean rating on this scale such that *higher* mean ratings indicated a *more favorable* attitude regarding sport specialization.

Sport pathway expectations. A key contribution of the DMSP is that the model’s pathway descriptions relate to both the ability to develop talent as well as the likelihood of producing an enjoyable developmental experience. It can thus be gathered that participants possess expectations for their holistic development throughout their adoption of a participation pathway, leading to the inclusion of three constructs (i.e., sport enjoyment, social enjoyment, performance success) as observed variables in this study’s conceptual framework.

Though previous measures have quantified athletes’ expectations of their sport involvement (i.e., Eccles & Harold, 1991), the variables of interest in this study indicated the participant’s expectations from *selecting their sport pathway*. Therefore, the conceptualization of items from previous literature was adopted to detail expectations of their selected pathway. To clearly operationalize “participation pathways” prior to presenting these items, this term was again clarified to the participant with the instruction: “The following questions relate to your sport participation pathway – meaning whether you specialized in one sport or played multiple sports – from elementary school through high school. Please rate the following items related to your perceptions of your sport participation pathway.” For the three pathway expectation variables, the stem of “as you progressed through your sport pathway (from Elementary School, to Middle School, to High School), to what degree did you expect that your sport participation pathway would lead to...” was used. Using the scale of previous expectancy research, each item

was rated on a 7-point Likert scale (1 = not at all; 7 = very much)(Eccles, Wigfield, Harold, & Blumenfeld, 1993).

Expectation of sport enjoyment. Using the stem listed above regarding pathway-related expectations, the single item for this variable asked participants to rate their expectation that their pathway would lead to “an enjoyable sport experience.”

Expectation of social enjoyment. Non-specific to the sporting context, this construct examined the athlete’s expectation that their selected pathway would create a positive social experience for them across the course of their development. Therefore, this item used the same stem while examining the expectation that their pathway would lead to “an enjoyable social experience.”

Expectation of performance success. This variable quantified the athlete’s expectation that their selected pathway would lead to successful performance. Utilizing the common stem and verbiage consistent with the DMSP, two items prompted athletes to rate their expectation of their selected pathway leading to successful performance 1) “in High School sports (e.g., making a team, receiving playing time, winning championships or awards, etc.),” and 2) “beyond High School sports (e.g., playing in college, receiving a scholarship, playing professionally, etc.)”. Due to the exploratory nature of the study and this newly created variable, analyses were conducted using both the mean of these two items as well as separate, independently observed variables.

Sport pathway experiences. Aligned with the developmental approach of this study, this experiential factor moves beyond the expectations an athlete has of their pathway to their perceptions of the resulting experience. In examining the DMSP through an ecological lens, it is important to examine how an athlete’s pathway selection impacts their multidimensional, holistic

development. Therefore, a group of variables mirroring the participation *expectation* variables (i.e., perceived pathway satisfaction = expectations of sport enjoyment; perceived social enjoyment = expectations of social enjoyment; perceived sport competence = expectations of performance success) were included to examine how the athlete's pathway manifested in their perceptions of their multidimensional experience. Similar to the expectation group, a common stem was used for these items (with the exclusion of the previously validated burnout measure): "As you reflect back, to what degree has your participation pathway (from Elementary School, to Middle School, to High School)..." To coincide with their sport expectation variable counterparts, these experiential factors used the same 1-7 Likert scale (i.e., 1 = not at all; 7 = very much).

Perceived pathway satisfaction. The first variable aimed to quantify the athlete's perceived athletic experience stemming from their selected participation was that of their satisfaction in this decision. This single item asked them to rate the degree to which they "are satisfied with their participation pathway."

Perceived social enjoyment. An underexplored variable in relation to participation pathways is how an athlete's specialized vs. diversified status relates to their social experience. Therefore, in this study the previously mentioned stem was used for a single item asking them the degree to which their sport pathway led to "an enjoyable social experience."

Perceived sport competence. Another important element of the sport specialization discussion is how this practice may lead to the development of an athlete's athletic talent. Thus, this variable asked the athletes to reflect on their perception that their pathway has led to "successful sport performance."

Burnout. The last variable of the testing protocol explored a concept frequently posited as likely for highly specialized athletes: Athletic burnout. To measure this variable, the Athletic Burnout Questionnaire (ABQ) was used. This validated measure is comprised of 15 items (e.g., “I feel physically worn out from my sport”), five items for each of three dimensions of burnout (1) Physical and emotional exhaustion; 2) Reduced sense of accomplishment in their sport; and 3) Devaluation of sport, (Raedeke & Smith, 2001) scored on a 5-point Likert scale (i.e., 1 = never; 5 = most of the time), with two items being reverse scored; Cronbach’s alpha reliability coefficient for this scale in the current sample was .89.

Data Analysis Strategy

All data analysis was conducted through the use of IBM SPSS Version 26.0 (IMB Corp, 2018). Though treating each of the framework’s variables as observed implicitly assumes that the items directly represent the constructs desired, due to this study’s exploratory, hypothesis-generating nature these items were deemed sufficient for initial exploration of this proposed conceptual heuristic. Based on the nature of each variable (i.e., categorical, continuous, interval scale) and the research question posed by each variable relationship in this conceptual framework (e.g., do groups significantly differ; what is the degree of the relationship between variables; does a variable significantly predict group differences), appropriate analyses were selected to examine the strength and direction of relationships of the variables accounted for in this testing battery. Throughout this three-part set of analyses a p-value of .05 or less indicated a significant relationship between variables, and effect sizes of correlation coefficients were interpreted as .10 being small, .30 being moderate, and .50 being large (Cohen, 1992). The fully operationalized conceptual diagram of this proposed ecological framework is provided as Figure

3.3, and each of the relationships explored through this analysis strategy are subsequently detailed.

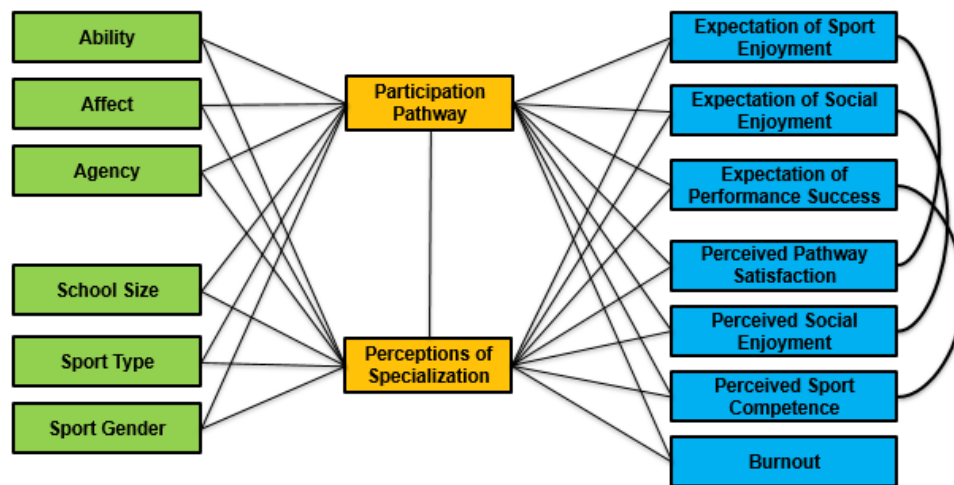


Figure 3.3. Operationalized Proposed Ecological Conceptual Framework

Preliminary demographic and sport background analyses. Before analyzing the strength and direction of relationships between variables in this proposed conceptual framework, a series of descriptive analyses were first conducted in order to better contextualize the sample. This involved examining the frequency of variable groups for categorical variables (i.e., grade in school, school size, sport gender, signature sport type, participation pathway) and descriptive results (means and standard deviations) of the full sample for continuous variables (i.e., ability, affect, agency, perceptions of specialization, expectation of sport enjoyment, expectation of social enjoyment, expectation of performance success, perceived sport enjoyment, perceived social enjoyment, perceived sport competence, and burnout). Additionally, a handful of relevant relationships between surveyed variables provided a meaningful basis for interpreting remaining results of the relationships of the proposed conceptual framework.

Prevalence of athletes currently specializing. Previous research of sport participation pathways has varied widely in the resulting estimates of the prevalence of sport specialization (i.e., 13% - 63%; DiSanti & Erickson, 2019) depending on how this characteristic was defined and measured. In the current study, athletes who are in the ES or LS pathways have explicitly indicated their perceived specialized status as current high school athletes; therefore, these two pathway groups' combined proportion of the total sample will provide context to interpretation of further results based on this understanding of how common specialization is among the sample's participants.

Participation pathway & age. Because previous research has shown a positive relationship between participant age and the likelihood of specialization, descriptive analyses of participation pathways (means and standard deviations) and a one-way ANOVA were calculated to determine if athletes in the more specialized pathways differed significantly in their mean age in comparison to the later specializing or multisport pathways.

Participation pathway & number of sports. Two sport background items asked participants to list the sports they had played at any point in the high school or club sport context, as well as the sports in which they were currently participating. The difference between these participation characteristics allowed for a cursory estimation of sport dropout among the athletes in this sample, and also allowed for interesting implications to be gleaned in relation to the participation pathway groupings. Notably, the mean number of sports *currently* played for each pathway explicitly explored a potential extension to our understanding of sport specialization: When specialization is defined not just by behaviors, but also by the participant's *perception* of their pathway, is it possible to play more than one sport (i.e., M is greater than 1) and still self-classify as a specializing athlete? Additionally, the number of sports ever and currently played

were examined by groups through a one-way ANOVA, which uncovered any group differences in terms of the number of sports played by athletes among these three DMSP pathway groups.

Contextual characteristics & number of sports. Due to the previously mentioned relationships between school size, sport type, and sport gender and the prevalence of sport specialization, these categorical variables were also examined through a one-way ANOVA to determine if the contextual classifications differed significantly in the number of sports played (at any point as well as currently).

Participation pathway & perceptions of sport specialization. This relationship was important to examine at the front end of data analysis due to its importance in understanding the degree of relationship between participant behaviors and perceptions. As mentioned earlier, application of sport specialization literature has tended to imply that behaviors indicate an underlying perception of this practice, but without the explicit link of these two constructs this relationship remains unclear. Therefore, a one-way ANOVA was conducted to examine if the participation pathway groupings differed in their perceptions of specialization, and based on the descriptive results of the groups' mean ratings, this was also useful information for subsequent interpretation in knowing whether those in more prolonged and more specialized sport pathways perceived specialization more positively than their less specialized counterparts.

Primary analyses: Relationships of proposed conceptual framework variables. Due to the novel approach of this study to conceptually situate ecological characteristics of the athletic experience in conjunction with behaviors and perceptions, analyses exploring the strength and direction of relationships between these selected variables were viewed as the primary means of analysis. In reference to the operationalized conceptual framework illustrated previously as Figure 3.3, the analyses for each of the six sets of variables are detailed from top-

to-bottom and left-to-right:

Individual characteristics & participation pathway. The first set of analyses examined whether the mean scores of participant ratings of individual characteristics (i.e., ability, affect, agency) differed significantly between the three pathway groups (i.e., ES, LS, RM) using a one-way ANOVA. The mean scores of each pathway group for these three variables were also of interest, as these figures provided new information regarding the relative manifestation of these constructs for these three theoretical pathways.

Individual characteristics & perceptions of specialization. Next, correlation analyses were conducted for the three individual characteristics (ability, affect, agency) in relation to perceptions of specialization, which was indicated by mean score of the 25-item YSSPS. Statistically significant relationships as well as the strength and direction of these correlations were of interest for the exploratory scope of this study.

Contextual characteristics & participation pathway. To determine if the three categorical variables comprising contextual characteristics (i.e., school size, sport type, and sport gender) were correlated with the categorical participation pathway groups (i.e., ES, LS, RM), a chi-square test was conducted between each contextual factor and the participation pathway variable to determine if they exhibited statistically significant relationships.

Contextual characteristics & perceptions of sport specialization. The three contextual characteristics (school size, sport type, sport gender) were also examined in relation to perceptions of sport specialization; a one-way ANOVA was conducted for each contextual characteristic (i.e., school size, sport type, sport gender) to determine if these groups significantly differed in their perceptions of sport specialization.

Participation pathway & sport pathway expectations. Moving into the relationships between specialization factors and experiential factors, a one-way ANOVA was run between the participation pathway groupings and the three pathway expectation variables (i.e., expectation of sport enjoyment, expectation of social enjoyment, expectation of performance success) to determine if these groups differed in their mean ratings on these three expectation scales. Interpretation of the group means also provided novel information regarding the relative average ordering of these expectation variables among the three pathway groups.

Participation pathway & sport pathway experiences. A similar set of analyses were conducted between the participation pathway variable and the four pathway experience variables (perceived pathway satisfaction, perceived social enjoyment, perceived sport competence, and burnout). One-way ANOVAs tested for significant differences in ratings between pathways, and the means of each pathway group illustrated each pathway's outcomes regarding the likelihood of delivering a successful, enjoyable sport experience.

Perceptions of specialization & sport pathway expectations. Next, analyses of correlation were conducted between perceptions of specialization (i.e., mean ratings on the YSSPS) and the three pathway expectation variables (expectation of sport enjoyment, expectation of social enjoyment, expectation of performance success). This set of analyses illustrated the relationship between what athletes think about sport specialization and the expectations they possess when selecting their sport pathways.

Perceptions of specialization & sport pathway experiences. Similarly, correlations between perceptions of specialization and the four sport pathway experience variables (i.e., perceived pathway satisfaction, perceived social enjoyment, perceived sport competence, and

burnout) were examined. These results helped to better understand how participants' attitudes relate to their multidimensional sport experiences.

Pathway expectation & perceived pathway experience variables. Lastly, an area of interest in this study dealt with the relationship of constructs within the experiential factor variables. More specifically, items in this survey were designed to match the participants' expectations of their sport pathway to their perceived experiences as they approached the end of said pathway. Therefore, correlation analyses were conducted between these three sets of matched variables (i.e., expectation of sport enjoyment & perceived pathway satisfaction; expectation of social enjoyment and perceived social enjoyment; expectation of performance success and perceived sport competence). The strength and direction of these correlations provided new insight regarding the degree to which athletes experience the outcomes they expect from adopting their sport participation pathway.

Secondary analyses: Exploratory relationships. In addition to the primary analyses of relationships between variables situated in this proposed ecological conceptual framework, due to the exploratory nature of this study several other relationships were examined in order to flesh out the ecological experiences of the high school student-athletes in this sample.

Individual characteristics & participation pathway groups. Because this proposed heuristic conceptually identifies individual factors (ability, affect, and agency) as contributing to the participants' selected sport pathways, one exploratory strategy of note was to treat the pathways as a continuous variable (i.e., ES = 1 (most specialized); LS = 2 (moderate specialization; RM = 3 (least specialized) and to conduct a multiple linear regression analysis for these three individual variables in terms of their prediction of participation pathway group. Though the nature of this analysis and the pathway variables led to a high degree of caution in

interpreting these results, this analysis and the resulting regression coefficients provided a cursory understanding of the relative contribution of each individual factor in predicting the three DMSP-oriented pathway groups.

Individual characteristics & perceptions of specialization. Another aspect of this framework is that the three individual factors (i.e., ability, affect, agency) are also viewed to influence the participants' perceptions of sport specialization. Each of these three variables are correlated with perceptions of sport specialization in isolation through the primary analysis strategy, but in this exploratory analysis the relative contribution of each variable in predicting perceptions of specialization was calculated through a multiple linear regression analysis.

Correlations of pathway expectation & pathway experience variables by pathway groups. Another previously mentioned weakness of the sport specialization literature is the field's over-reliance on retrospective designs that often solely ascribe the athlete's expectations and experiences to their ultimate outcomes. In this study, the relationship between pathway expectations and pathway experiences are explored multidimensionally through three sets of experiential variables; moreover, the degree to which athletes get what they expect was detailed through examining correlations of the three pairs of matched expectation/experiential variables (i.e., expectation of sport enjoyment & perceived pathway satisfaction; expectation of social enjoyment and perceived social enjoyment; expectation of performance success and perceived sport competence) for each of the pathway groups while treating them as independent samples. Succinctly, did these pathways differ regarding their likelihood to deliver the experience that athletes expected when they adopted them?

Methodological Considerations

To conclude, several aspects of the methodology of this study are necessary to address. First, this was not intended to be an exhaustive model of the many factors that contribute to an athlete's selection of participation pathway; however, this framework still presented an important step in better situating the variables previously identified in the literature as relevant to this selection through empirical examination. Additionally, due to the exploratory, hypothesis-generating nature of this study, no a priori predictions regarding the nature of relationships (i.e., specific hypotheses) were used in the study design; however, the results of data analysis are interpreted in relation to previous research findings in the discussion. Next, the use of the Developmental Model of Sport Participation in this study is limited mostly to the single vs. multi-sport pathways that it identifies; another key element of this model is the *nature* of play between these different stages (i.e., free play vs. structured play, fun vs. competition). Though this factor is implicitly considered through some of the elements of the current study, it is important to acknowledge that further inquiry would be needed to further flesh out participation pathways in accordance with the full scope of the DMSP. Finally, though the variables in this study have been identified as conceptually pertinent to sport participation pathway selection, few validated measures have been explicitly used to identify this process. Therefore, further psychometric analysis of the measures created for the sake of this study should be conducted as necessary, and caution in interpreting the results of this study was of utmost importance.

CHAPTER IV: RESULTS

Descriptive Results of Demographic & Sport Background Characteristics

An extended demographic and sport background breakdown of the study's total sample is provide in Table 4.1. Of the total sample's 132 participants, 67 self-classified their pathway as Early Specialization (50.8%), 27 (20.5%) as Late Specialization, and 34 (25.8%) as Recreational Multisport; demographic and sport background frequencies for each of these three DMSP pathway groups are provided in Table 4.2. Four participants' (3.0%) self-identified pathways did *not* fit these three DMSP conceptual groupings, and due to the small number of participants in this group, the variability in their pathways, and the lack of theoretical implications related to these alternative pathways, this group was excluded from the primary analyses of the study.

Table 4.1.
Demographic & Sport Background Frequencies of Total Sample

Demographic/Sport Background Characteristic	Frequency (% of total sample)			
Grade	<u>9</u> 35 (27.3%)	<u>10</u> 35 (27.3%)	<u>11</u> 31 (24.2%)	<u>12</u> 27 (21.1%)
High School Classification	<u>A</u> 82 (64.1%)	<u>B</u> 29 (22.7%)	<u>C</u> 14 (10.9%)	<u>D</u> 3 (2.3%)
Sport Gender	<u>M</u> 52 (40.6%)		<u>F</u> 76 (59.4%)	
Signature Sport Type	<u>Individual</u> 24 (18.8%)		<u>Team</u> 104 (81.3%)	
Signature Sport	Baseball: 5 (3.9%)			
	Basketball: 31 (24.2%)			
	Cross Country: 9 (7.0%)			
	Football: 21 (16.4%)			
	Golf: 6 (4.7%)			
	Ice Hockey: 12 (9.4%)			
	Rugby: 2 (1.6%)			
	Soccer: 20 (15.6%)			
	Softball: 5 (3.9%)			

Table 4.1. (cont'd)

Tennis: 2 (1.6%)
 Track & Field: 4 (3.2%)
 Volleyball: 7 (5.5%)
 Wrestling: 1 (0.8%)

Table 4.2.

Demographic & Sport Background Frequencies by Participation Pathways

Demographic/Sport Background Characteristic	Frequency (% of total sample)			
Early Specialization (ES) (n = 67)				
Grade	<u>9</u> 15 (22.4%)	<u>10</u> 22 (32.8%)	<u>11</u> 19 (28.4%)	<u>12</u> 11 (16.4%)
High School Classification	<u>A</u> 41 (61.2%)	<u>B</u> 16 (23.9%)	<u>C</u> 8 (11.9%)	<u>D</u> 2 (3.0%)
Sport Gender	<u>M</u> 28 (41.8%)	<u>F</u> 39 (58.2%)		
Signature Sport Type	<u>Individual</u> 9 (13.4%)	<u>Team</u> 58 (86.6%)		
Signature Sport	Baseball: 3 (4.5%)			
	Basketball: 20 (29.9%)			
	Cross Country: 4 (6.0%)			
	Football: 13 (19.4%)			
	Golf: 1 (1.5%)			
	Ice Hockey: 7 (10.4%)			
	Rugby: 0 (0.0%)			
	Soccer: 10 (14.9%)			
	Softball: 2 (3.0%)			
	Swimming: 1 (1.5%)			
	Tennis: 1 (1.5%)			
	Track & Field: 1 (1.5%)			
	Volleyball: 3 (4.5%)			
	Wrestling: 1 (1.5%)			
Late Specialization (LS) (n = 27)				
Grade	<u>9</u> 9 (33.3%)	<u>10</u> 4 (14.8%)	<u>11</u> 5 (18.5%)	<u>12</u> 9 (33.3%)
High School Classification	<u>A</u> 16 (59.3%)	<u>B</u> 7 (25.9%)	<u>C</u> 4 (14.8%)	<u>D</u> 0 (0.0%)
Sport Gender	<u>M</u> 14 (51.9%)	<u>F</u> 13 (48.1%)		
Signature Sport Type	<u>Individual</u> 8 (29.6%)	<u>Team</u> 19 (70.4%)		

Table 4.2. (cont'd)

Signature Sport	Baseball: 0 (0.0%)			
	Basketball: 4 (14.8%)			
	Cross Country: 4 (14.8%)			
	Football: 4 (14.8%)			
	Golf: 3 (11.1%)			
	Ice Hockey: 4 (14.8%)			
	Rugby: 2 (7.4%)			
	Soccer: 3 (11.1%)			
	Softball: 1 (3.7%)			
	Swimming: 0 (0.0%)			
	Tennis: 1 (3.7%)			
	Track & Field: 1 (3.7%)			
	Volleyball: 1 (3.7%)			
	Wrestling: 0 (0.0%)			
<hr/>				
<i>Recreational Multisport (RM) (n = 34)</i>				
<hr/>				
Grade	<u>9</u> 11 (32.4%)	<u>10</u> 9 (26.5%)	<u>11</u> 7 (20.6%)	<u>12</u> 7 (20.6%)
High School Classification	<u>A</u> 25 (73.5%)	<u>B</u> 6 (17.6%)	<u>C</u> 2 (5.9%)	<u>D</u> 1 (2.9%)
Sport Gender	<u>M</u> 10 (29.4%)	<u>F</u> 24 (70.6%)		
Signature Sport Type	<u>Individual</u> 7 (20.6%)	<u>Team</u> 27 (79.4%)		
Signature Sport	Baseball: 2 (5.9%)			
	Basketball: 7 (20.6%)			
	Cross Country: 1 (2.9%)			
	Football: 4 (11.8%)			
	Golf: 2 (5.9%)			
	Ice Hockey: 1 (2.9%)			
	Rugby: 0 (0.0%)			
	Soccer: 7 (20.6%)			
	Softball: 2 (5.9%)			
	Swimming: 2 (5.9%)			
	Tennis: 1 (2.9%)			
	Track & Field: 2 (5.9%)			
	Volleyball: 3 (8.8%)			
	Wrestling: 0 (0.0%)			

Preliminary Demographic and Sport Background Analyses

Prevalence of athletes currently specializing. Analyzing the frequency and proportion of athletes in the ES and LS pathways helped to contextualize this sample by identifying the current prevalence of specialization of the high school athletes in this sample. Of the sample's 128 total participants with DMSP-oriented participation pathways, 67 self-identified as early specializers, while 27 self-identified as late specializers who had sampled multiple sports during elementary school and middle school before specializing in their signature sport during high school. Therefore, 94 (73.4%) of participants perceived themselves as currently specializing in their signature sport at the time of data collection.

Participation pathway & age. A one-way ANOVA conducted to determine whether participant pathway groups differed by age indicated that these pathway groups did not significantly differ by their age: $F(2, 125) = .41, p = .664$. In terms of the pathway groups' descriptive properties, mean age was very tightly dispersed with the LS pathway exhibiting the highest average age ($M = 15.89$ years old, $SD = 1.22$), followed by RM ($M = 15.74$ years old, $SD = 1.36$), and finally ES ($M = 15.63, SD = 1.27$).

Participation pathway & number of sports. Next, the participation pathway groups were analyzed to determine any significant group differences in the number of sports participated in (both at any point in their high school career, as well as currently). A one-way ANOVA yielded a non-significant difference between groups regarding sports played at any point in their high school tenure ($F(2, 125) = 1.17, p = .313$; ES: $M = 3.07, SD = 1.48$; LS: $M = 2.78, SD = 1.28$; RM: $M = 3.32, SD = 1.25$), while there was a significant difference between groups when it came to the number of sports they were *currently* playing ($F(2, 125) = 5.49; p < .001$). When looking at the descriptive statistics of groups in this regard, interestingly the RM group exhibited

the highest mean ($M = 2.32$ sports, $SD = .73$), but it was the ES group that was next ($M = 1.88$ sports, $SD = .77$), with the LS group possessing the lowest amount of sports on average ($M = 1.70$ sports, $SD = .87$). A Bonferroni post hoc analysis confirmed significant group differences between the RM group and both the ES (Mean difference = .43, $p = .024$) and LS (Mean difference = .620, $p < .01$) groups.

Contextual characteristics & number of sports. Similar one-way ANOVA calculations illuminated any differences between groups of the three contextual characteristics (i.e., school size, sport type, sport gender). The results of these analyses for number of sports played at any point, and for number of sports played currently are presented below in Table 4.3 and 4.4 respectively. For both number of sports played at any point as well as number of sports currently playing, significant differences were found for school size and sport gender: Athletes in Class A and Class D schools had the highest means in number of sports ever played and number of sports currently playing, respectively, followed by Class B in both cases; Class C athletes had the lowest mean number of sports played for both of these participation variables.

Table 4.3.

Number of Sports Played at any Point by Category of Contextual Characteristics

Variable	N	Mean (SD)	F-Value	Sig.
School Size			3.19*	$p = .026$
A	82	3.30 (1.39)		
B	29	2.90 (1.32)		
C	14	2.14 (1.23)		
D	3	3.00 (1.00)		
Signature Sport Type			2.13	$p = .147$
Individual	24	2.71 (1.49)		
Team	104	3.16 (1.35)		
Sport Gender			7.91**	$p = .006$
Male	52	2.67 (1.23)		
Female	76	3.36 (1.42)		

* = significant at the $p < .05$ level; ** = significant at the $p < .01$ level

Table 4.4.

Number of Sports Currently Playing by Category of Contextual Characteristics

Variable	N	Mean (SD)	F-Value	Sig.
School Size			2.88*	$p = .039$
A	82	2.05 (0.78)		
B	29	1.86 (0.79)		
C	14	1.50 (0.86)		
D	3	2.67 (0.58)		
Signature Sport Type			0.33	$p = .565$
Individual	24	1.88 (0.90)		
Team	104	1.98 (0.79)		
Sport Gender			7.48**	$p = .007$
Male	52	1.73 (0.80)		
Female	76	2.12 (0.78)		

* = significant at the $p < .05$ level; ** = significant at the $p < .01$ level

Participation pathway & perceptions of sport specialization. Finally, an important contextualizing preliminary analysis was to determine whether perceptions of sport specialization significantly differed by participation pathway. Since the three pathways differ in terms of their point at which the athletes specialized – or whether they specialized at all – it could be logically inferred that their perceptions of specialization would differ in terms of the positive or negative nature of this practice. In this sample, a significant difference was found between pathway groups ($F(2, 123) = 6.82; p = .002$); a Bonferroni post hoc test indicated that these group differences existed between the ES & RM groups (Mean difference = .23, $p < .01$) and the LS & RM groups (Mean difference = .25, $p < .01$). The relative mean rating ordering (from highest to lowest) was: LS: $M = 2.21$, $SD = .27$; ES: $M = 2.18$, $SD = .34$; and lastly RM: $M = 1.95$, $SD = .32$, indicating that athletes who had specialized *later* after failing to do so in elementary and middle school actually exhibited slightly more favorable perceptions of sport specialization than their earlier specializing peers.

Primary Analyses: Relationships of Proposed Conceptual Framework Variables

Statistical analysis examining the strength and direction of variable relationships in the proposed conceptual framework were conducted through a series of analyses. Figure 4.1 illustrates the operationalized proposed conceptual ecological model in its entirety, and these relationships form the primary analysis of the current study. Thus, the resulting analyses and findings (sorted by each factor grouping) are presented piece-by-piece below:

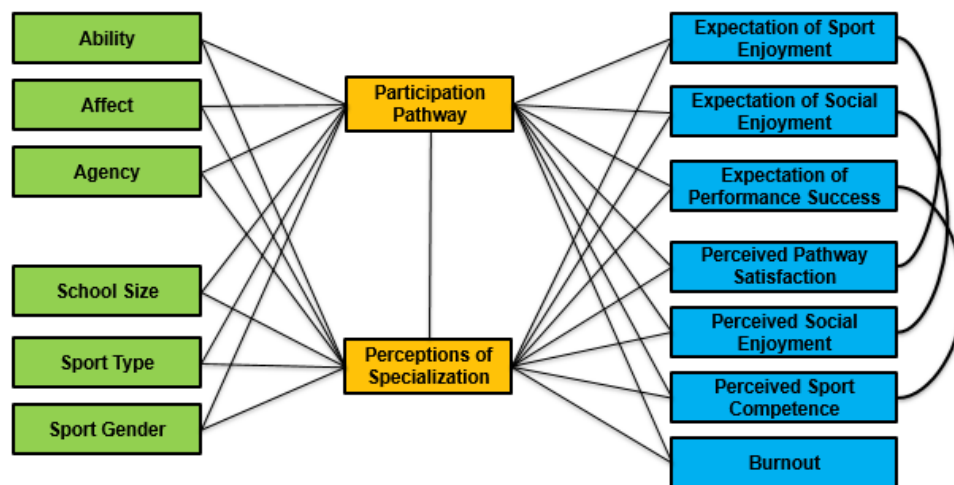


Figure 4.1. Full Operationalized Proposed Ecological Conceptual Framework

Individual characteristics & participation pathway.

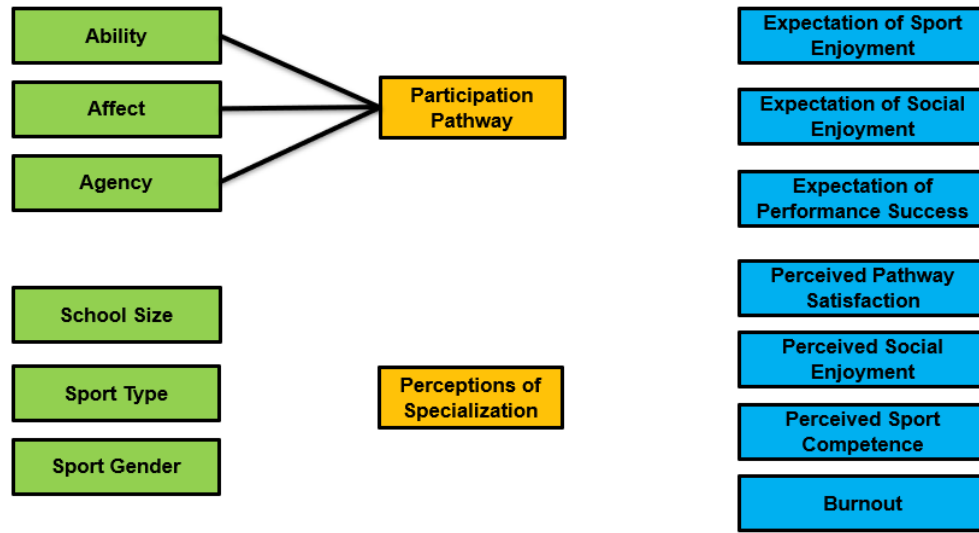


Figure 4.2. Individual Characteristics and Participation Pathway

Each of the three individual characteristic variables in this proposed model were analyzed to determine in relation to the three DMSP participation pathways in order to determine if their means significantly differed by pathway. Results of these analyses are illustrated below in Table 4.5. Though none of these three variables showed statistically significant difference of their pathway groups, the relative order of their means was notable in the exploratory scope of this study. In terms of ability, late specializers exhibited the highest average rating ($M = 7.03$, $SD = 0.90$), followed by recreational multisport athletes ($M = 6.85$, $SD = 0.98$), with the early specializers actually tending to rate these items the lowest ($M = 6.67$, $SD = 1.17$). For affect, the mean rating for comparing affect associated with their signature sport in relation to potential alternatives was almost identical for the ES and LS groups (ES: $M = 4.45$; $SD = 0.68$; LS: $M = 4.46$, $SD = 0.71$), with the RM group demonstrating a lower mean rating ($M = 4.21$, $SD = 0.78$). Finally, the results of the pathway groups' ratings of agency (on the continuum from extreme external control to extreme internal control) showed the closest value to statistical significance

$F(2, 120) = 2.03, p = .136$), with RM participants showing the highest mean rating (i.e., the most internally-driven perception of pathway agency)($M = 2.81, SD = 0.55$), followed by LS ($M = 2.68, SD = 0.58$), with the ES participants exhibiting the lowest mean rating in terms of internal control of pathway selection ($M = 2.55, SD = 0.63$)

Table 4.5.

Mean Ratings of Individual Characteristics by Participation Pathway Groups

Variable	N	Mean (SD)	F-Value	Sig.
Ability			1.16	$p = .318$
ES	67	6.67 (1.17)		
LS	27	7.03 (0.90)		
RM	34	6.85 (0.98)		
Affect			1.42	$p = .246$
ES	66	4.45 (0.68)		
LS	26	4.46 (0.71)		
RM	33	4.21 (0.78)		
Agency			2.03	$p = .136$
ES	65	2.55 (0.63)		
LS	25	2.68 (0.58)		
RM	33	2.81 (0.55)		

Individual characteristics & perceptions of sport specialization.

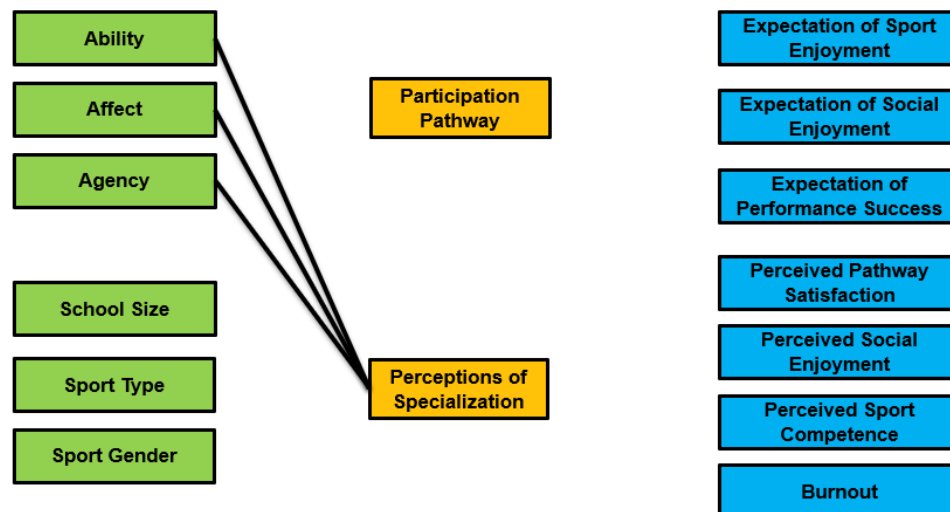


Figure 4.3. Individual Characteristics and Perceptions of Sport Specialization

Each of the three individual characteristics (ability, affect, agency) were also analyzed in terms of their relation to perceptions of specialization. Results of these bivariate correlation analyses indicated a significant, small positive correlation between affect and perceptions of specialization ($r(123) = .20, p = .028$). A small, nonsignificant negative relationship was found between agency and perceptions of specialization ($r(123) = -.10; p = .257$), and there appeared to be no directional relation between ability and perceptions of sport specialization ($r(126) = .01, p = .895$).

Contextual characteristics & participation pathway.

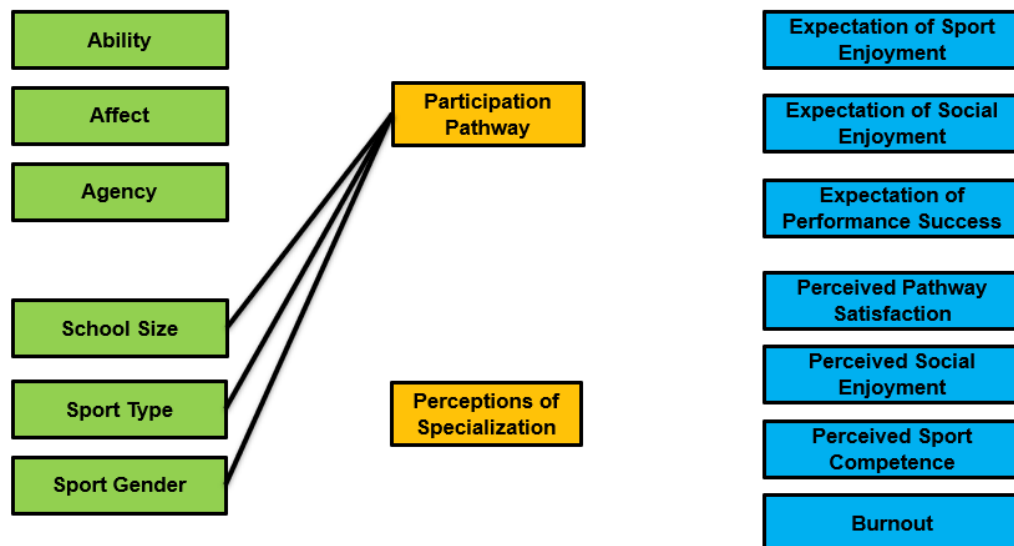


Figure 4.4. Individual Characteristics and Participation Pathway

Chi-squared tests between the three contextual characteristic variables (i.e., school size, sport type, and sport gender) and the participation pathway classifications indicated a statistically non-significant relationship between school size and participation pathway $\chi^2(6, N = 128) = 3.24, p = .779$; a non-significant relationship between sport type and participation pathway $\chi^2(2, N =$

128) = 3.42, $p = .181$; and a non-significant relationship between sport gender and participation pathway $\chi^2(2, N = 128) = 3.22, p = .200$.

Contextual characteristics & perceptions of sport specialization.

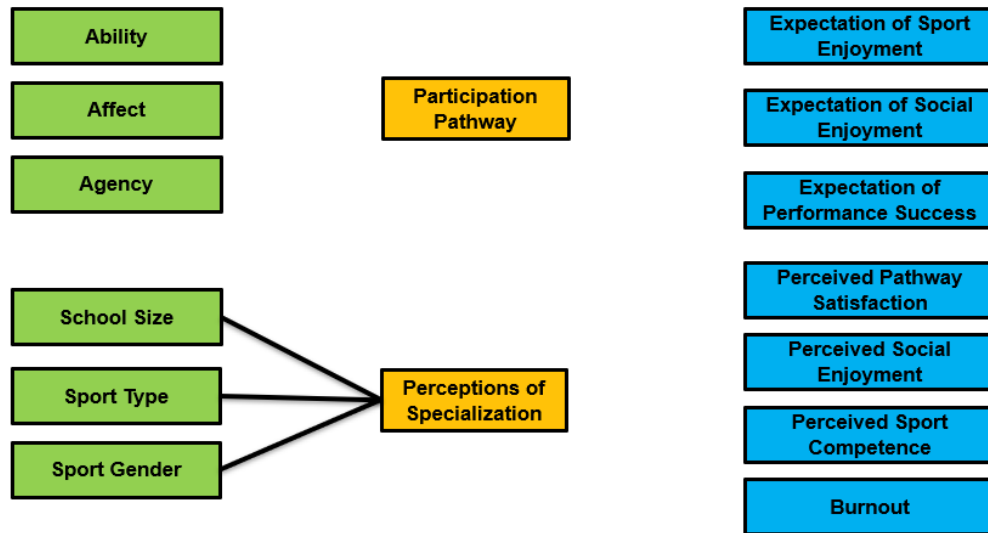


Figure 4.5. Contextual Characteristics and Perceptions of Sport Specialization

Next, one-way ANOVAs were conducted for each of the three contextual characteristics (i.e., school size, sport type, sport gender) in order to examine if the different categorical groupings for each variable significantly differed in their mean rating of sport specialization. Results indicated a significant effect of school size on perceptions of specialization ($F(3, 122) = 3.31; p = .022$), in which mean ratings (from highest to lowest) were as follows: Class C ($M = 2.38, SD = 0.37$), Class D ($M = 2.15, SD = 0.37$), Class B ($M = 2.14, SD = 0.31$), and finally Class A ($M = 2.07, SD = 0.17$). A Bonferroni post hoc test indicated that these significant group differences only existed between Class A & Class C (Mean difference = .31, $p = .014$). For signature sport type, no significant group differences were found, ($F(1, 124) = .44; p = .511$), though on average individual sports exhibited specialization perceptions that were slightly higher ($M = 2.16, SD = 0.32$) than team sports ($M = 2.11; SD = 0.33$). Finally, the one-way ANOVA

results of sport gender showed a significant difference between these contexts ($F(1, 124) = 5.84$; $p = .017$), with males having a significantly higher mean rating of specialization perceptions ($M = 2.21$, $SD = 0.32$) than females ($M = 2.06$; $SD = 0.33$).

Participation pathway & sport pathway expectations.

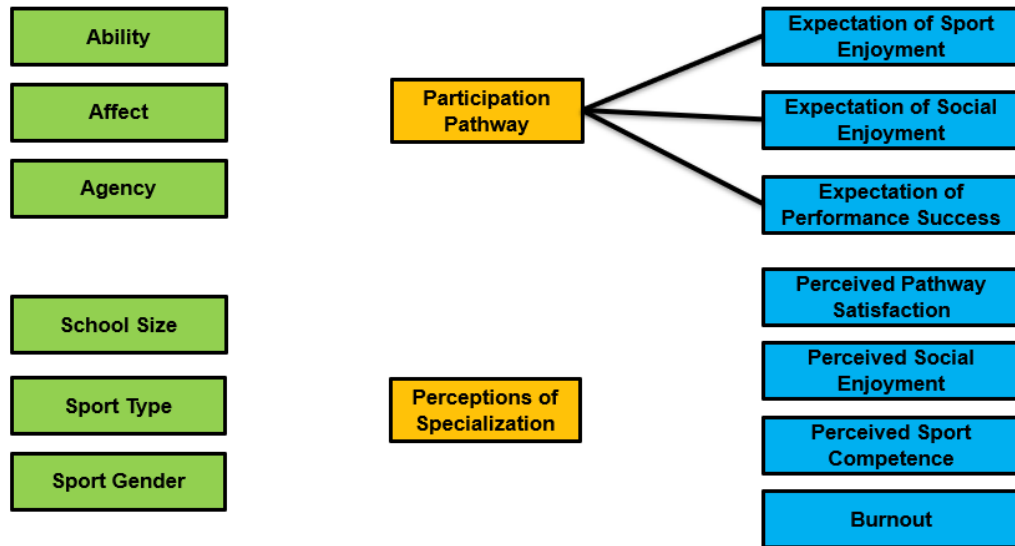


Figure 4.6. Participation Pathway and Sport Pathway Expectations

The next step in analysis was to examine whether the categorical participation pathway groups significantly differed in the three sport pathway expectation variables (expectation of sport enjoyment, expectation of social enjoyment, expectation of performance success). None of these expectation variables reached the requisite level of statistical significance to indicate that pathway groups differed, though the relative order of group means was of interest due to the exploratory nature of this model. For expectation of sport enjoyment, ($F(2, 125) = .59$, $p = .554$), LS participants had the highest mean rating ($M = 6.19$, $SD = 0.74$), followed by ES ($M = 6.13$, $SD = 0.89$), with RM having the lowest mean rating ($M = 5.97$, $SD = 0.83$). For expectation of social enjoyment ($F(2, 125) = .90$, $p = .410$), LS participants also had the highest mean rating ($M = 6.48$, $SD = 0.85$), with RM participants next ($M = 6.26$, $SD = 0.86$), and finally ES ($M = 6.21$,

$SD = 0.93$). Finally, for the mean expectation of performance success ($F(2, 125) = 1.26, p = .288$) ES participants rated this expectation the highest ($M = 5.42, SD = 1.11$) with LS participants next ($M = 5.12, SD = 1.19$) and RM rating their expectation of performance success the lowest ($M = 5.07, SD = 1.18$). However, when separating the expectation performance into the single items for “expectation for sport performance in high school” ($F(2, 125) = .44, p = .646$) and “expectation for sport performance *beyond* high school sport” ($F(2, 125) = 1.66, p = .194$) the latter appeared to be a better (though not statistically significant) query for fleshing out pathway group differences regarding the pursuit of elite performance so that ES athletes ($M = 4.93, SD = 1.55$) had a higher mean rating than LS ($M = 4.56, SD = 1.69$) with RM athletes having the lowest average expectation that their pathway would lead to elite performance beyond the high school level ($M = 4.29, SD = 1.95$).

Participation pathway & sport pathway experiences.

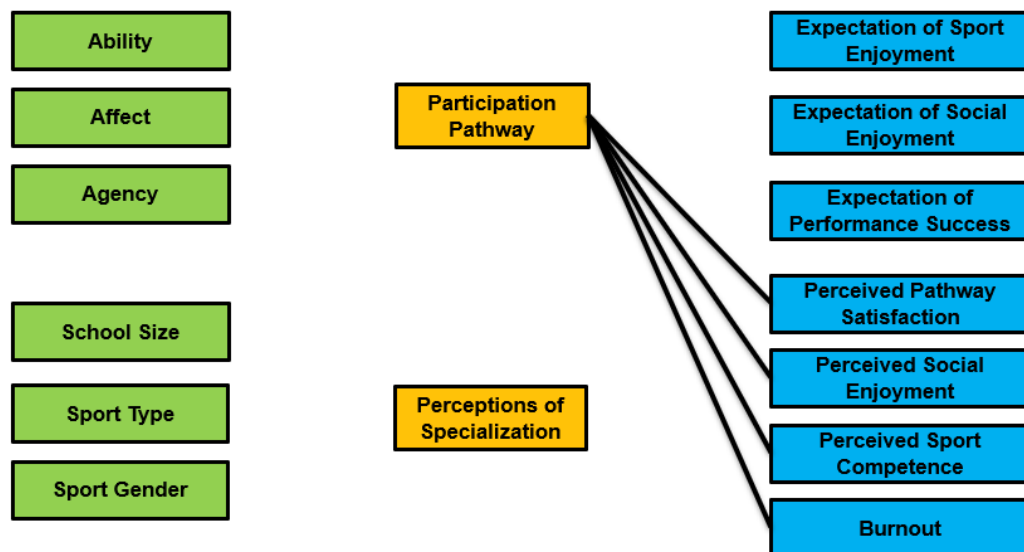


Figure 4.7. Participation Pathway and Sport Pathway Experiences

Similar to the analyses of participation pathway and sport pathway expectations, one-way ANOVAs were conducted to judge whether pathway groups significantly differed in their sport

pathway experience variables (i.e., perceived pathway satisfaction, perceived social enjoyment, perceived sport competence, and burnout). Also mirroring the pathway expectation variables, none of the pathway experience variables reached a level of statistical significance to indicate that they meaningfully differed by participation pathway either. Perceived pathway satisfaction ($F(2, 125) = .116, p = .891$) was highest for RM ($M = 6.03, SD = 0.90$), then LS ($M = 6.00, SD = 0.88$), and finally ES ($M = 5.94, SD = 0.95$), while perceived social enjoyment came the closest to statistical significance ($F(2, 125) = 2.824, p = .063$) with the LS group exhibiting the highest mean ($M = 6.59, SD = 0.57$) followed by RM ($M = 6.15, SD = 0.96$, with ES participants having the lowest average perceptions of social enjoyment ($M = 6.12, SD = 0.98$). Perceived sport competence did not show statistically significant group differences ($F(2, 125) = .096, p = .909$); (ES: $M = 5.87, SD = 1.00$; LS: $M = 5.85, SD = 0.91$; RM: $M = 5.94, SD = 0.74$), and burnout ($F(2, 125) = .823, p = .442$) was rated highest on average by the ES group ($M = 2.01, SD = 0.61$), followed by RM ($M = 1.94, SD = 0.64$), with LS rating these items lowest on average ($M = 1.84, SD = 0.50$).

Perceptions of sport specialization & sport pathway expectations.

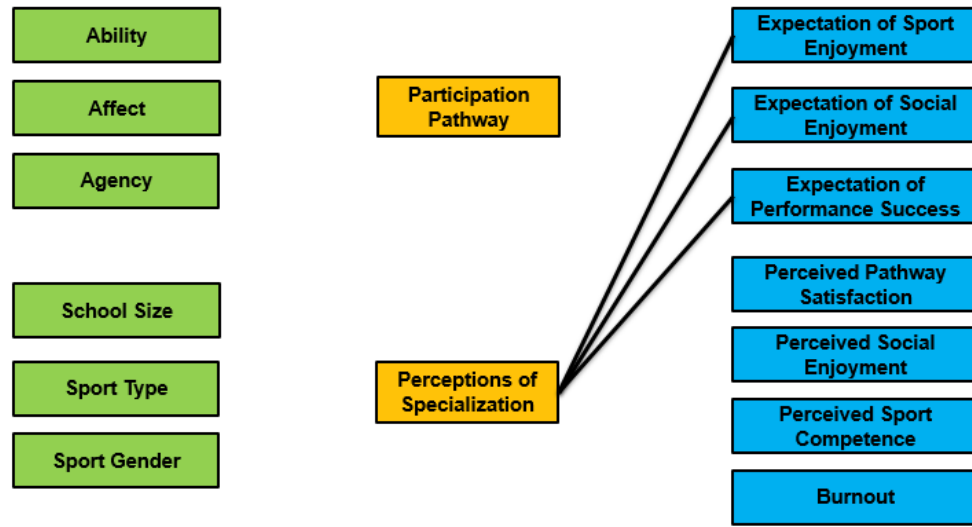


Figure 4.8. Perceptions of Sport Specialization and Sport Pathway Expectations

Bivariate correlational analyses were conducted between the perceptions of specialization variable and each of the three sport pathway expectation variables (i.e., expectation of sport enjoyment, expectation of social enjoyment, and expectation of performance success). Results of these bivariate correlation analyses indicated a non-significant relationship between perceptions of specialization and each of these pathway expectation variables (Sport enjoyment: ($r(126) = -.05$, $p = .547$; expectation social enjoyment ($r(126) = -.12$, $p = .194$); expectation of performance success ($r(126) = -.14$; $p = .121$)).

Perceptions of sport specialization & sport pathway experiences.

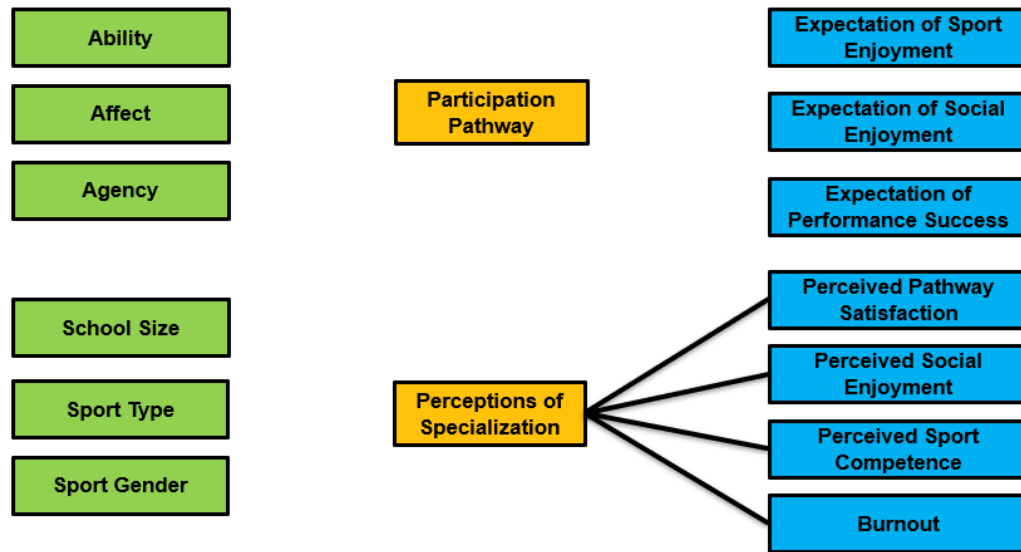


Figure 4.9. Perceptions of Sport Specialization and Sport Pathway Experiences

Mirroring the process of sport pathway expectations, bivariate correlational analyses were conducted between the perceptions of specialization variable and each of the four sport pathway experience variables (i.e., perceived pathway satisfaction, perceived social enjoyment, perceived sport competence, and burnout). Non-significant results indicating little-to-no relationships were found between perceptions of sport specialization and perceived pathway satisfaction ($r(126) = .02$; $p = .842$), social enjoyment ($r(126) = .01$; $p = .945$), and perceived sport competence ($r(126) = -.14$; $p = .128$). However, there was a statistically significant small positive correlation found between perceptions of specialization and burnout ($r(126) = .182$; $p = .042$), indicating that those who perceived specialization more positively tended to also be more likely to become burned out.

Pathway expectation & perceived pathway experience variables.

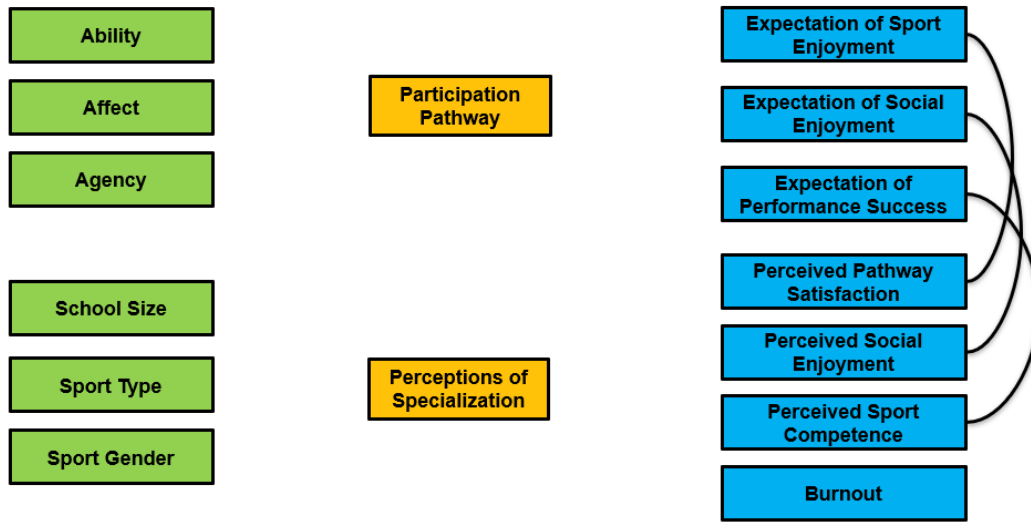


Figure 4.10. Pathway Expectation and Perceived Pathway Experience Variables

Finally, in addition to the examination of strength and direction of variables situated between factor categories this conceptual framework, a novel focus of this study also prompted the examination of factors *within*-factor variables to flesh out these areas of the sport pathway picture. Using the three sets of paired pathway expectation and pathway experience variables (i.e., expectation of sport enjoyment and perceived pathway satisfaction; expectation of social enjoyment and perceived social enjoyment; expectation of performance success and perceived sport competence), bivariate correlational analyses illustrated found significant relationships between all three of these pairs: expectation of sport enjoyment and perceived pathway satisfaction ($r(128) = .30; p = .001$), expectation of social enjoyment and perceived social enjoyment ($r(128) = .52; p < .001$), and expectation of performance success and perceived sport competence ($r(128) = .47; p < .001$). It is also noteworthy that both of the individual expectation of performance items were also significantly positively correlated with perceived sport competence: Expectation for performance in high school: $r(128) = .39; p < .001$; expectation for

performance *beyond* high school: $r(128) = .413$; $p < .001$, though with a slightly lower effect size than when using the participants' mean ratings of these items.

Secondary Analyses: Exploratory Relationships

Participation pathway groups & perceptions of specialization: Contextual characteristic covariates. As mentioned previously in the preliminary analyses section, results of the one-way ANOVA conducted to examine group differences between participation pathway groups in terms of their mean ratings of perceptions of specialization was statistically significant ($F(2, 123) = 6.82$; $p = .002$). To further explore the impact of contextual characteristics in regards to this relationship, a one-way ANCOVA was conducted using each of these three contextual characteristics as a covariate: There was a significant difference in mean rating of perceptions of specialization between pathways when adjusting for school size: $F(2, 122) = 6.26$, $p = .003$, in which the means of the ES ($M = 2.17$, $SE = .04$) and LS ($M = 2.20$, $SE = .06$) were significantly higher than the RM group ($M = 1.96$, $SE = .05$), though the effect size was small (.09). There was also a significant difference in mean rating of perceptions of specialization between pathways when accounting for signature sport type: $F(2, 122) = 6.82$, $p = .002$, in which the means of the ES ($M = 2.18$, $SE = .04$) and LS ($M = 2.20$, $SE = .06$) were once again significantly higher than the RM group ($M = 1.95$, $SE = .05$) with a small effect size (.10). Finally, there was still a significant difference of specialization perceptions between pathways when accounting for sport gender, $F(2, 122) = 5.89$, $p = .004$, in which the means of the ES ($M = 2.18$, $SE = .04$) and LS ($M = 2.19$, $SE = .06$) were significantly higher than the RM group ($M = 1.96$, $SE = .05$), with a small effect size (.09). In sum, adding contextual characteristics as covariates in analysis of pathway differences in terms of specialization perceptions did not

appear to alter the nature or degree of differences between groups found without these contextual considerations.

Individual characteristics & specialization factors. Though each of the individual factors (i.e., ability, affect, agency) were tested for their correlation to perceptions of specialization in the primary analyses section, due to these three constructs' interrelatedness in the preliminary qualitative study from which they emerged, two multiple linear regression analyses were conducted. First, these three individual characteristics were examined in relation to their relative contributions and prediction of participation pathway; results indicated a low degree of variance in participation pathways explained by these three individual variables ($R^2 = .072$), though this regression model of three individual characteristic variables was found to significantly participation pathways: $F(3, 118) = 3.041, p = .032$. Breaking down each aspect the model, agency was the only of the three variables to reach statistical significance in contributing to the model, though all three variables had a p -value of <0.1 . The full results of this multiple linear regression analysis are presented in Table 4.6:

Table 4.6.

Multiple Linear Regression Results for Participation Pathway by Individual Characteristics

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% CI for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
Model (Constant)	1.106	.702	--	1.575	.118	-.284	2.496
Ability	.124	.074	.156	1.673	.097	-.023	.272
Affect	-.215	.110	-.180	-1.944	.054	-.434	.004
Agency	.277	.127	.195	2.186	.031*	.026	.528

*Significant at the $p < .05$ level

Next, a second multiple linear regression analysis was conducted regarding these three individual characteristics and their contribution and prediction of sport specialization perceptions. Results of this analysis indicated a low degree of variance explained by these three individual characteristic variables ($R^2 = .054$), and that this model was not found to be a good fit

for the data ($F(3, 118) = 2.26, p = .09$); however, affect was found to contribute significantly to the model's prediction of perceptions of sport specialization. The results of this analysis are shown in Table 4.7 below:

Table 4.7.
Multiple Linear Regression Results for Perceptions of Specialization by Individual Characteristics

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% CI for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	1.981	.276	--	7.168	.000	1.43	2.53
Ability	-.021	.029	-.069	-.728	.468	-.079	.037
Affect	.102	.044	.220	2.347	.021*	.016	.188
Agency	-.060	.050	-.109	-1.210	.229	-.159	.038

*Significant at the $p < .05$ level

Correlations of pathway expectation & pathway experience variables by pathway groups. Finally, to determine the degree to which participants perceived the developmental outcomes they had experienced as aligned with their expectations of selecting their participation pathways, the relative strength and directions of correlations were explored by treating each pathway group as an independent sample. The results for each of these paired variables (i.e., expectation of sport enjoyment & perceived pathway satisfaction; expectation of social enjoyment & perceived social enjoyment; expectation of performance success and perceived sport competence) will be interpreted further in the discussion section, and are shown in Table 4.8 below:

Table 4.8.

Correlations of Pathway Expectation and Pathway Experience Variables by Participation Pathway

Expectation & Experience Variable Pair	<i>N</i>	Correlation Coefficient	Sig.
Sport Enjoyment			
ES	67	.297*	.015
LS	27	.197	.372
RM	34	.403*	.018
Social Enjoyment			
ES	67	.472**	<.001
LS	27	.182	.364
RM	34	.758**	<.001
Performance Success			
ES	67	.481**	<.001
LS	27	.571**	.002
RM	34	.406*	.017

*Correlation is significant at the 0.05 level; **Correlation is significant at the 0.01 level

Summary

Figures 4.11 & 4.12 summarize the results of the primary analyses of this dissertation study; Figure 4.11 illustrates the significance or lack thereof of group differences in regard to continuous variables; variables in which groups significantly differed at the $p < .05$ level are in connected by a bold line and marked by an asterisk, while those with a thin line and no indication were non-significant in their group differences. Three significant group differences were found: 1) Perceptions of specialization differed by school size; 2) Perceptions of specialization differed by sport gender; 3) Perceptions of specialization differed by participation pathway. No pathway expectation or experience variable significantly differed by participation pathway.

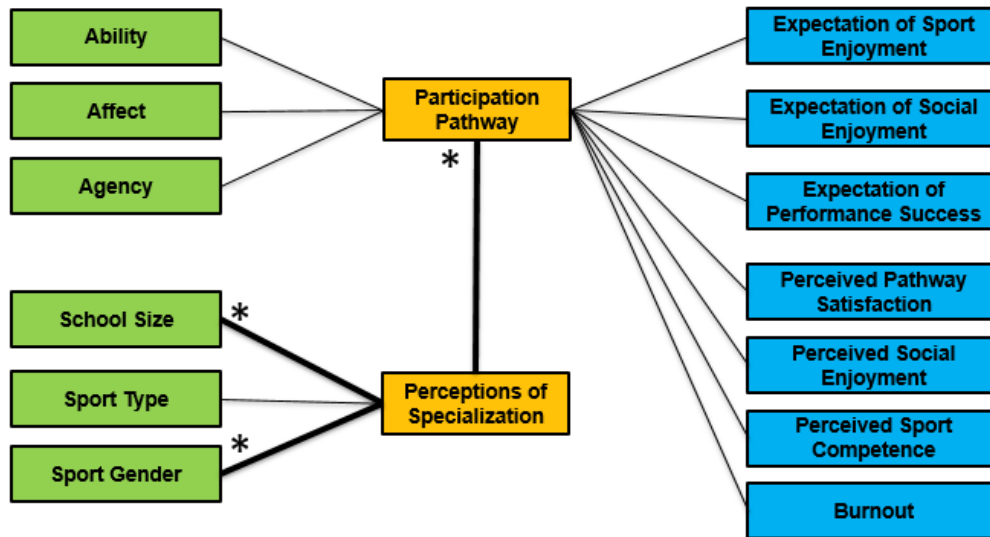


Figure 4.11. Results of Analysis of Group Differences Between Variables

Note. Variables connected by a bold and marked with an asterisk significantly differ by group at the $p < .05$ level.

Figure 4.12 shows the results of correlation analyses, indicating the direction of relationships between these variables as well as whether they were significantly related. Variable relationships in which at least a small effect size was found have their directionality indicated by their color (i.e., $r \leq -0.10$ = red; or $r \geq 0.10$ = green) and relationships which were significant at the $p < .05$ level are linked by bold lines and marked by an asterisk. Five significant relationships were found between variables of this proposed model: 1) A positive relationship between perceived affect and perceptions of specialization; 2) A positive relationship between perceptions of sport specialization and burnout; 3) A positive relationship between expectation of sport enjoyment and perceived pathways satisfaction; 4) A positive relationship between expectation of social enjoyment and perceived social enjoyment; 5) A positive relationship between expectation of performance success and perceived sport competence.

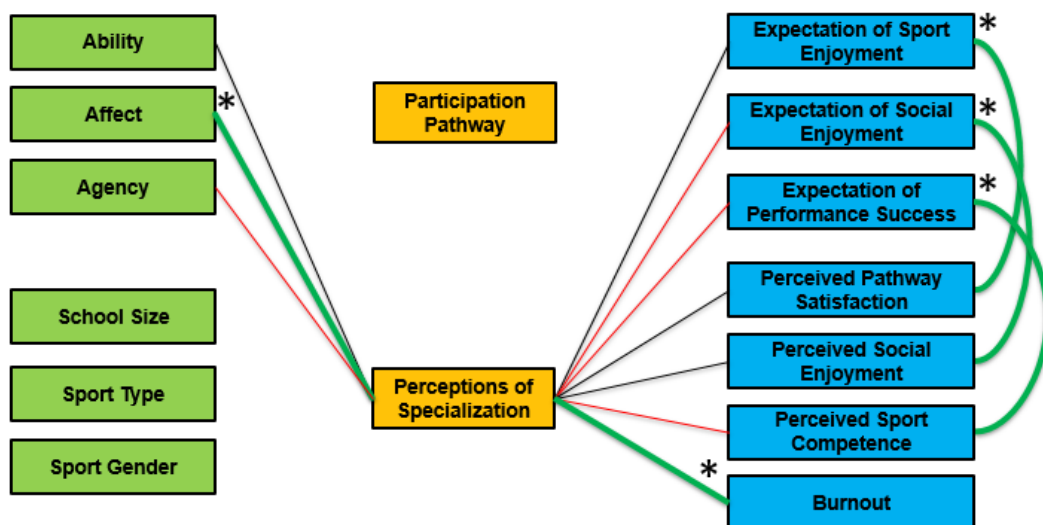


Figure 4.12. Results of Correlation Analyses Between Variables

Note. Variables connected by a bold and marked with an asterisk significantly are significantly related at the $p < .05$ level; variables connected by a red line exhibited a negative effect ($r \leq -0.10 = \text{red}$), and variables connected by a green line exhibited a positive effect ($r \geq 0.10$)

Additionally, demographic and sport background characteristics were analyzed and it was found that the majority of athletes in this sample (73.4%) were currently specializing. Analysis of pathway group differences indicated that pathways significantly differed in the number of sports in which athletes currently participate, while school size and sport gender groups significantly differed in their number of sports both at any point and currently. Finally, it was notable that the ES and LS athletes perceive specialization significantly more favorably than RM athletes.

Lastly, secondary exploratory analyses highlighted more meaningful relationships for the variables situated in this proposed ecological conceptual framework. It was found that the group differences between pathway regarding their perceptions of sport specialization still existed when contextual characteristics were controlled, the regression equation of the three individual characteristics (i.e., ability, affect, agency) significantly predicted participation pathway

grouping, and the degree of correlation between paired pathway expectation and pathway experience variables differed between the different pathway groups.

CHAPTER V: DISCUSSION

The purpose of this study was to examine youth athletes' pathways of sport participation (specifically, whether they chose to specialize vs. play multiple sports) through an exploratory ecological approach. Based on the initial introduction of this proposed conceptual ecological model, the novelty of the methodology, and the hypothesis-generating nature of the study, in a practical sense rather than to test the selected variables and model relationships through a confirmatory factor analysis, the results of this study were intended to elucidate how these variables were conceptually situated within a single sample of currently-competing high school athletes. By exploring the strength and direction of the relationships between variables and comparing them to previous research of sport specialization and talent development, this study helped to validate, challenge, or extend previous findings and subsequent practical application of sport specialization research and theoretical models. Finally, the relationships found between the three different conceptual levels of the model (i.e., ecological factors, specialization factors, and experiential factors) aimed to provide a meaningful and fresh understanding of how an athlete's system, their perceptions, and their experiences interrelate to shape their development through youth sport participation. Based on these findings, the results of this study also serve as an empirically grounded launching point for future research and a potential reworking of this conceptual ecological model. Below, the results and associated implications of the findings are expanded upon to better understand what was found in regard to the understanding of the ecology of sport participation pathways. Next, the results are interpreted through the lens of the two theoretical guiding frameworks (i.e., the Developmental Model of Sport Participation & Bronfenbrenner's Person-Process-Context-Time Model) to interpret how these findings fit or challenge the assumptions of these models. Finally, the limitations and methodological

considerations of this study will be noted and future research directions stemming from this study's design and execution will be explored.

Preliminary Demographic and Sport Background Results

Before detailing the primary results of the relationships between the proposed ecological model variables, several descriptive properties of the sample related to their demographic/sport background characteristics were explored to better contextualize this sample.

Prevalence of athletes currently specializing. Because a clear conceptualization of specialization and participation pathways were essential to the participant's understanding of items throughout the testing protocol, interpretation also was aided by an initial understanding of the overall sample's specialization status. In terms of pathway prevalence, the most commonly self-identified pathway was early specialization, i.e., "ES" (67 participants, 50.8% of the total sample), followed by recreational multisport, i.e., "RM" (34 participants, 25.8% of total sample), with late specialization, i.e., "LS" being the least prevalent (27 participants, 20.5% of the total sample). Because the operational definition of these pathways posited both ES and LS athletes as currently specializing during high school sport participation, this meant that 94 participants (73.4% of the total sample) perceived themselves as specializing at the point of data collection. This figure is a bit higher than previous estimates of specialization that have occurred retrospectively with former high school athletes who were asked simply whether or not they specialized in a single sport (i.e., 56%, Russell, 2014; 63%, Russell & Symonds 2015). When compared to a three-item scale that operationalized the "degree" to which they were specialized (Jayanthi et al., 2014), the combined prevalence of ES and LS athletes in the current study was relatively close to the combined prevalence of athletes self-classifying as "high" and "moderate" (i.e., 65.6%) in a study of currently competing high school athletes by Bell and colleagues

(2016). However, a second study using this scale found only 40.5% of current athletes to self-rate as “high” or “moderate” specialists. It is possible that the contextual characteristics of this sample (i.e., a high prevalence of athletes from the largest high school size classification) may have led to more specialized sport behaviors, even if significant relationships based on school size were not found in terms of specialization perceptions. Additionally, it was made clear to the participant in the study protocol that they should rate their participation as specialized if they perceived themselves as training and competing for more than 8 months a year while excluding other sport options, which did not preclude them from classifying as an early or late specialist even if they played more than one sport. At this point it is hard to firmly argue that one precise way of defining specialization is more salient to this issue than the other; what is more likely, is that consistently clearer and more nuanced ways of defining athlete pathways that account for both physiological (i.e., training behaviors, degree of specialization) and psychosocial (i.e., perceptions of specialization, self-defined pathway status) aspects would allow for a more precise and valid system of defining participants’ specialization characteristics and overall prevalence through further research.

Participation pathway & age. Next, several analyses related to participation pathway differences and demographic/sport background characteristics were conducted. Previous research has shown a positive correlation between age and specialization (Baker, Côté, & Abernethy, 2003; Ginsburg et al., 2014; Moesch, Elbe, Hauge, & Wikman, 2011). However, no significant difference was found between participant pathways regarding the mean age of their participants, exhibiting a small range of only .26 years of age between the group with the highest mean (LS, $M = 15.89$) and the group with the lowest mean (ES, $M = 15.63$). This result indicates that in the current sample, athletes were not more likely to adopt specialized pathways as they transitioned

into high school sport, indicating that the inflection point regarding sport investment or continued sampling may occur *prior* to the high school years associated with Stage 3 of the DMSP (Côté, 1999; Côté, Baker, & Abernethy, 2007).

Participation pathway & number of sports. In terms of number of sports, significant group differences between pathways were found for number of sports *currently* participating, but not for number of sports participated in at any point during their high school years. However, the relative order of mean sports was the same for both of these characteristics: RM athletes had the highest average number of sports, followed by ES, with LS athletes listing the lowest mean in terms of their sports played or currently playing. It is not surprising that RM athletes – who by definition never specialized in a signature sport – have sampled and continued playing the most sports of the three pathways; it is surprising, however, that the LS group averaged less sports played and currently playing than the other two pathways – significantly so when it came to current number of sports. These results indicate that those who sample multiple sports before specializing in high school (i.e., the LS pathway) may find the *diversification* of their sport agenda less tenable and more exhausting than their peers who have become accustomed to specialization in one sport even while participating in multiple sports (i.e., the ES pathway) or those who have undertaken a continued sampling pathway (i.e., RM). Further depth of inquiry regarding this finding would be a fascinating next step in understanding the qualitative experiences of athletes in the LS pathway group related to their decision – and subsequent experience – to become newly specialized in high school.

Moreover, a simple but important finding from this study is that when the term “sport specialization” is clearly defined through the participant’s self-perception, athletes who play multiple sports can clearly still view themselves as specializing. This is evidenced by the mean

number of sports currently playing being well over “1.00” for both the ES and LS groups. Therefore, using precise terminology to differentiate “specialization” from “exclusive specialization” (i.e., Vealey & Chase, 2015) and understanding that perceptions may be equally important – if not of greater influence – than behaviors in regard to the athletic experience, are important considerations for future research.

Contextual characteristics & number of sports. Number of sports were also analyzed in relation to group differences by contextual characteristics (i.e., school size, signature sport type, and sport gender). A significant difference was found for school size in this regard, though the relative order of group means was unexpected. For number of sports played at any point during the high school years, rather than the smallest school sizes exhibiting the largest group mean as could be predicted from previous research (Bell et al., 2016), it was actually the largest school size classification (Class A) with the highest mean. For number of sports currently playing, though Class D had the highest mean amount of sports playing, the rest of the classifications showed a relative decrease in their mean amount of sports from Class A to Class C. Due to the small sample sizes of Class C ($n = 14$) and especially Class D ($n = 3$), this relative ordering should be interpreted with caution, but it is notable that even with the increased competition for playing time and roster spots which characterize larger schools, athletes in this group tended to undertake and maintain a more diverse sporting agenda during the scope of their high school sport careers.

Next, number of sports was examined to uncover any significant group differences between individual and team sports. One study in this regard found athletes in individual sports as more likely to specialize (Buckley et al., 2017), thus it could be expected that the number of sports (both played at any point and currently playing) would be higher for athletes with a team-

based signature sport. Though neither of these relationships were statistically significant to indicate group differences, the mean number of sports was higher for the team sport athletes than the individual sport athletes in terms of both of these characteristics, reinforcing this sport classification distinction as an important consideration in understanding sport specialization through an ecological lens.

The final contextual characteristic examined in relation to number of sports was that of sport gender. Previous empirical examination of athlete gender or athlete sex has indicated that female athletes are more likely to specialize earlier and to a greater degree than male athletes (Barynina & Vaitsekhovskii, 1989; Post, Trigsted et al., 2017; Stevenson, 1990), though this finding was not replicated in a recent study of current US Division I athletes (Post, Bell et al., 2017). In the current study, a significant group difference was found between the sport gender groups, but in fact it was the females who had a higher number of sports both played at any point in their high school tenure as well as currently playing. Though this finding may cast doubt on the notion that females tend to exhibit more specialized patterns of sport participation, characteristics of this study's sample (detailed further in the "methodological considerations" section) lead to caution in interpreting these findings. Taken in conjunction with previous research, the equivocal nature of findings related to sport gender and sport specialization underscores the importance of a team or school's individual culture in shaping athletes' specialized or diversified sporting behaviors.

Participation pathway & perceptions of sport specialization. The final preliminary analysis serves as an effective transition point from sport background/demographic features of the sample into the variables comprising this proposed conceptual ecological model. Previous research related to sport specialization and athlete participation pathways has insufficiently

surveyed athlete perceptions of their pathway selection and experience, opting instead to look solely at participant behaviors (i.e., number of sports played, time at specialization, number of hours in training in competition)(e.g., Ford, Ward et al., 2009; Ford, Low et al., 2009; Güllich, 2016.) Literature discussing youth sport specialization has tended to vaguely describe this relationship, often attributing specialization (at any age) to external factors (e.g., parent/coach pressure for elite status attainment, professionalized climate of youth sport)(Coakley, 2010), and early sampling/continued multisport participation as driven more by the athlete's internal factors (e.g., positive affect and ability in multiple sports)(DiSanti, Wright, Chase, & Erickson, in review). Therefore, a perceived strength of this study is its examination of the link between what participants are doing and their *perceptions* of what they are doing. The link between the athlete's ratings on the Youth Sport Specialization Perception Scale and their described pathway presented a window into this relationship; logically, athletes who viewed sport specialization more positively would be likely to adopt a more specialized pathway. Results of this study indicated that athletes did significantly differ by pathway in regard to their perceptions of sport specialization: The athletes who were later to specialize (LS) had the highest mean rating on this scale, followed closely by the early specializers (ES), with recreational multisport (RM) exhibiting the lowest group mean. This finding supports the notion that athletes are acting pragmatically in their selection of participation pathway, meaning that those who endorse specialization to a greater degree are more likely to adopt a pathway that leads to specialized participation in high school. At this point it remains unclear whether the athlete's positive perceptions of specialization led to their specialized pathway, or if their specialized pathway influenced their perceptions of specialization as a means of rationalizing the effectiveness of their decision to ultimately specialize. However, the general consistency between participation

pathways and perceptions of specialization allows for greater clarity in interpreting the results of the primary analyses in this study.

Primary Results: Relationships of Proposed Conceptual Framework Variables

This proposed ecological conceptual understanding of sport participation pathways aimed to succinctly configure meaningful elements of the pathway selection and experience processes based on previous exploration of youth sport specialization literature and the lead author's on-going line of research. Therefore, the significance and nature of relationships between variables in this conceptual framework served as the primary results of this dissertation; their key findings and implications for youth sport researchers and practitioners are detailed below.

Individual characteristics & participation pathway.

Ability & participation pathway. According to talent development literature, athletes who aspire to reach elite levels of sport should adopt a specialized pathway either early (i.e., Ericsson, Krampe, & Tesch-Römer, 1993) or in more contemporary thinking, at least by the time they reach high school age (i.e., Côté, 1999; Côté et al., 2009). The results of the current study found no significant group differences between pathways in regard to perceived ability; looking at the relative order of these group means, LS athletes rated their ability the highest, followed by RM athletes, with ES rating their ability lowest on average. Though non-significant, this ordering presents an interesting implication regarding how participants select their pathways based on their ability: Rather than selecting a specialized pathway due to a perception of high ability in their signature sport, early specializing athletes may view themselves as *lacking* in ability, requiring them to specialize early in order to continue successful participation. One study in the growth and motor coordination domain indicated that athletes who specialize early have an initial advantage in markers of strength and coordination, but that those who adopt a diversified

sport pathway will ultimately surpass their early specializing competition in this regard (Fransen et al., 2012). Applying that finding to this study, it appears possible that athletes who are lower in perceived ability may flip the specialization switch early due to the belief that they will not be able to keep up to specializing athletes. Alternatively, the results of this previous research indicate that the LS group of the current study may possess a more positive perception of their ability due to this being objectively the case, or may even be more resilient to initial advantages of early specializers due to their perception of high ability even as they sample multiple sports.

Affect & participation pathway. Literature related to talent development and specialized participation in a signature sport posits that those who specialize in a signature sport from an early age may do so due to a high degree of enjoyment in their signature sport in comparison to potential sport alternatives (DiSanti, Wright, Chase, & Erickson, in review). Therefore, it could be expected that the participant's rating in the "affect" variable would be highest for those who have maintained an "early specialization" pathway into their high school years, followed by those who have adopted a "late specialization" pathway by specializing in high school, and finally the lowest difference in affect between signature and potential sport alternatives would be for the "recreational" pathway. In this sample, no significant difference in affect was found in relation to the participant pathway groups, though the relatively higher means for the ES and LS groups in comparison to the RM group do support the notion that if an athlete *does* decide to specialize, they are likely to have a larger gap in their positive affective experience between their signature sport and potential alternatives.

Agency & participation pathway. Another conceptual argument that has built momentum in literature and popular media (e.g., Coakley, 2010; Gregory, 2017) is that the stakeholders in an athlete's support and guidance system exert pressure on athletes to adopting a specialized

pathway. However, previous research related to sport specialization and pathways of participation has insufficiently explored the relationships between stakeholders (DiSanti & Erickson, 2019). Therefore, this study explored how the athlete's agency to select their sport participation pathway – as well as the perceived pathway selection influence of their surrounding social agents and environment – corresponded to their manifested sport participation pathway. Though not statistically significant, the results of this study indicated that the groups' average perceptions of agency in their pathway selection were most internally driven in the RM group, followed by the LS group, with the ES group having perceptions most towards the external end of the agency continuum. This finding supports the notion that if left to their own preferences, athletes prefer a continued, diversified pathway of multisport participation. Based on this result, sport stakeholders should make efforts to critically analyze – and potentially alter – characteristics of the systematic high school sport climate to better allow for multisport participation.

Individual characteristics & perceptions of sport specialization.

Ability & perceptions of sport specialization. Because perception-based research has been such a rarity in regard to sport specialization, the association between an athlete's perceived ability and their perceptions of sport specialization has been completely unexplored. What has been offered in terms of the literature is research and perspective regarding the efficiency of specialized behaviors in terms of developing elite performance. An accumulation of research with elite athletes consistently elucidates that elite status can be reached without early specialization (Côté, Lidor, & Hackfort, 2009), and some studies have gone as far as to explicitly prompt athletes of their opinion of this practice – consistently showing that elite athletes do *not* endorse early specialization for developing athletes (Hill, 1993). However, research with more

general (i.e., not exclusively elite) athlete samples have implied a perceived utility of focused, specialized participation in maximizing athletic talent (Buckley et al., 2017; DiSanti et al., in review). Therefore, no specific a priori prediction for direction or strength of the correlation between these variables could be put forth. The results of this study reinforce the equivocal relationship between these variables, as the results were both non-significant and the correlation coefficient (.01) indicated that there was almost completely no relationship between these two variables in the current study. This finding suggests that an athlete's perceived ability (an individual perception) is a non-impactful factor in terms of their perceptions of sport specialization.

Affect & perceptions of sport specialization. Early and highly specialized participation pathways have been consistently linked to negative psychosocial outcomes such as burnout, dropout, and decreased enjoyment from sport (Brenner, 2007; Fraser-Thomas & Côté, 2008; Hill & Simons, 1989). However, recent qualitative exploration of the athlete pathway selection process added nuance to this relationship (DiSanti et al., in review), suggesting that athletes who adopt specialized pathways may be doing so simply because they associate a high degree of positive affect with their signature sport from an early age— especially in relation to potential sport alternatives. Therefore, the item created to measure “affect” in this study was designed to isolate this differential between enjoyment in their signature sport and those potential alternatives, which would logically amount in a positive relationship between their rated affect and their perceptions of specialization. The relationship found did reinforce this notion, as there was a small, positive significant correlation between affect and perceptions of specialization, indicating that those athletes who had a larger gap between the affect associated with their

signature sport and potential alternatives were more likely to endorse specialization in their signature sport.

Agency & perceptions of sport specialization. Finally, much speculation regarding how athletes wind up in specialized or diversified pathways has occurred (Coakley, 2010; Malina, 2010; Wiersma, 2000), yet the empirical foundation for these opinions remains tenuous. This leads to an ambiguous understanding of the relationship between an athlete's agency to select their own pathway and their perceptions of specialization. It is also important to note that despite the often posited notion that adults may pressure youth athletes into specializing early (e.g., Coakley, 2010), external influence (notably parents) of pathway selection has also been reported for athletes in terms of adopting late specialization and multisport pathways (DiSanti et al., in review). So, it is also possible that today's youth athletes endorse or reject the influence of external agents and their perceptions both for and against early sport specialization. Though not statistically significant, in this study a small, negative (-.10) correlation was found between participant agency and perceptions of specialization, suggesting that athletes who perceive their pathway selection as more internally controlled tend to view sport specialization more negatively. This coincides with the recently completed qualitative study (DiSanti et al., in review), suggesting that external influence that pushes athletes toward early sampling pathways may be just as impactful as early specializing messaging. Additionally, this finding aligns with the relationship found in this study between participation pathway group means and number of sports played, suggesting that when left to their own devices, athletes may prefer multisport participation rather than specialization.

Contextual characteristics & participation pathway.

School size & participation pathway. A notable contextual consideration that has been recently identified as impactful in youth athletes' participation pathway selections is that of their school size (Bell et al., 2016). Logically, athletes at larger schools must compete for the same amount of available roster spots and playing time as those at small schools but must do so against a much larger base of internal competition. Therefore, early and highly specialized pathways (ES and LS) could provide a leg-up in this regard, where this pressure may not be as evident in smaller schools at which participation and team involvement is more guaranteed. In this study, a statistically non-significant relationship was found between these variables, refuting the notion that school size is largely impactful in the pathways that athletes select. This finding is encouraging in regard to a high school sport program's ability to promote multisport participation if they so choose, regardless of the inherent pressures of larger school size.

Signature sport type & participation pathway. Another potential contextual influence of participants' adopted sport pathways is that of sport type; initial research in this area has found that athletes in individual sports (e.g., swimming, track and field, gymnastics) have been more likely to specialize than those in team sports (e.g., basketball, football, soccer)(Buckley et al., 2017). Though the explanatory drive for this trend remains unclear, potential mechanisms for this disparity could include increased visibility of individual results, a generally smaller roster in individual sports, and less inherent social interaction among peers. The result of the chi-squared test between these two variables was once again non-significant (though this was closest the of contextual characteristics to statistical significance, $p = .181$), implying that the athletes' classification of signature sport as individual or team based was not meaningful in relation to their selected participation pathway.

Sport gender & participation pathway. The last contextual variable included in this study was that of sport gender. As detailed in the methods chapter of this dissertation, this variable was treated as a contextual rather than individual variable working under the assumption that it is the *system* that influences these patterns of participation, rather than some sort of physiological difference between the participants' sex. Previous research has yielded somewhat equivocal findings in this regard; early inquiry linking participant gender and their specialization behaviors found females to be more likely to specialize, do so at an earlier age, and do so to a greater degree (Barynina & Vaitsekhovskii, 1989; Stevenson, 1990). More recent work has been less clear in terms of gender differences, with samples of currently competing athletes showing a higher degree of specialization at the high school level for females (Post, Trigsted et al., 2017), but insignificant gender differences in a sample of collegiate athletes (Post, Bell et al., 2017) The chi-squared test between these two variables was once again insignificant ($p = .200$), therefore sport gender was not viewed as meaningfully associated with selected pathway in this sample.

Contextual characteristics & perceptions of sport specialization.

School size & perceptions of sport specialization. Similar to the relationship between school size and participation pathway selection, it could be expected that athletes from larger schools would perceive a higher degree of utility for specialized pathways due to increased competition in their local system; however, without previous perception-based research to serve as conceptual foundation for this prediction, it remained a possibility that athletes in larger schools are funneled into these specialized pathways despite their preference against it, thus resulting in more negative attitudes towards specialization. In this study there was a significant effect of school size on perceptions of specialization, though not in the order expected. Participants in Class C rated specialization most favorably ($M = 2.38$), with Class D & Class B

exhibiting similar ratings ($M = 2.15$ and $M = 2.14$, respectively), and Class A rating specialization items the lowest ($M = 2.07$). This is a curious finding related to the previous literature and conjecture mentioned; once again it appears possible that the team and school cohorts which comprise large proportions of contextual groups in this sample (i.e., Class A schools) provide a more salient influence on perceptions of specialization than the larger contextual category does.

Signature sport type & perceptions of sport specialization. No prior research has investigated the relationship between signature sport type and *perceptions* of sport specialization – only signature sport type and actual participation behaviors (Buckley et al., 2017). Similar to school size, this lack of perception-based research does not allow for a clear prediction for the directionality of the relationship between these two variables to be made. In this sample, the results indicated no significant difference between individual and team sports in relation to their perceptions of sport specialization, though as expected the mean of the individual sport athletes was higher than those whose signature sport was team-based. Though further research is necessary, this initial exploration does align with the notion that athletes whose signature sport is individual may be more likely to view specialization as an adaptive training pattern.

Sport gender & perceptions of sport specialization. Lastly, early studies linking sport gender to perceptions of specialization found females to view specialization as a more effective practice than males (Barynina & Vaitsekhovskii, 1989; Stevenson, 1990), leading to the possibility that this group would rate specialization significantly higher than males in the current sample. However, the significant relationship found between sport gender and perceptions of specialization was actually reversed, as the male athletes perceived sport specialization more favorably than on average than females. It is possible that this finding indicates a changing

culture of male and female sports in regard to specialization beliefs, but due to some disclaimers about cohort effects related to teams and groups in the current study, further inquiry into the impact of this contextual characteristic on specialization perceptions is needed.

Participation pathway & sport expectations. The next set of analyses served to examine the link between an athlete's adopted participation pathway (i.e., their single vs. multisport status across the time points of elementary school, middle school, and high school sports) and those of their expectations stemming from this pathway. The specialized status of athletes has been frequently used as an indicator of their sport experience, though data in this regard has primarily been collected retrospectively or cross-sectionally with elite athlete populations (DiSanti & Erickson, 2019). However, little has been explored in terms of what athletes *expected* as they chose their specialization status across these levels, which misaligns conceptually with the treatment of sport pathways as a developmental experience (Horn, 2015).

Participation pathway & expectation of sport enjoyment. The first expectation linked to the athletes' selections of their sport pathways relates to the positive affective component associated with developmentally appropriate sport experiences (Côté & Lidor, 2012; Gould & Carson, 2008) as well as the author's previous qualitative work (DiSanti, Wright, Chase, & Erickson, in review). Simply, having fun is a frequently identified and highly valued expectation stemming from youth sport participation, thus it makes sense that by adopting a specific participation pathway, athletes form an associated expectation for the likelihood of creating an enjoyable sport experience (McCarthy, Jones, & Clark-Carter, 2008; Visek et al., 2015). No significant difference between participation pathways was found in terms of their expectations of sport enjoyment, though in their relative ordering of means, LS participants were highest, followed by ES, and RM having the lowest expectation of enjoyment. Again, this is was a non-

significant finding, but if this rank ordering is replicated in further studies while also indicating statistical significance, this relationship may support the notion that the LS pathway is most adaptive (i.e., an optimal mix of competitive success and enjoyment), while those who do sample multiple sports may find this pathway less enjoyable due to a lacking expectation of developing performance expertise.

Participation pathway & expectation of social enjoyment. Next, due to the psychosocial, ecological focus of this study, the athlete's expectation for their adopted pathway to lead to an enjoyable *social* experience was explored. Though no specific research has explored this relationship before, it was predicted that the professionalized view of the early specialization pathway – as well as the framing of continued multisport participation as “recreational” – would lead to a significantly higher expectation of social enjoyment for the RM and LS pathways compared to the early specialization pathway. No significant difference was found between pathways in this regard, though the LS pathway once again exhibited the highest mean; this time, the RM pathway was second, and the ES pathway participants rated their expectation for social enjoyment the lowest. These descriptive properties reinforce the popular notion that early, highly specialized pathways are perceived as less enjoyable even by those that adopt them, while also positioning the LS pathway as the most adaptive of these three options.

Participation pathway & expectation of performance success. Finally, the link between the participant's pathway selection and their expectation for performance success was explored. The popularized work of the “10,000 hours prescription” (Ericsson, Krampe, & Tesch-Römer, 1993) posited the ES pathway as most effective in this regard, though the later developmental work of the DMSP (Baker, Côté, & Abernethy, 2003; Côté, 1999) posited late specialization after early sampling pathway as the most adaptive in fostering elite performance while mitigating

the risks of physical and psychosocial risks associated with early specialization (Baker & Robertson-Wilson, 2003; Jayanthi et al., 2014; Malina, 2010). Additionally, the terming of “recreational” for the continued sampling of multiple sports positions this pathway as conceptually inferior in developing athletic talent. No significant difference was found for expectations of performance success by the participation pathways of this sample’s athletes, but in comparing their means these athletes seemed to endorse the 10,000 hours prescription (i.e., ES rated their expectation of performance the highest), with the LS pathway also associated with a higher expectation than RM. This difference became even more distinct when isolating the expectation of successful performance *beyond* high school, indicating that for those who wish to reach the highest level of sports, early specialization still may be seen as the most optimal pathway towards achieving this goal.

Participation pathway & sport pathway experiences. Next, this proposed conceptual framework sought to explore how an athlete’s selected participation pathway was associated with their multifaceted sport pathway experience. A key consideration in this study was the exclusive use of high school-aged athletes, allowing athletes to reflect back on their entire pathway as they approached the end of their youth sport window.

Participation pathway & perceived pathway satisfaction. The first aspect of the sport experience that was examined in relation to the selected pathway was that of perceived pathway satisfaction. Previous research and theory in youth sport has linked satisfaction in terms of need fulfillment (Adie, Duda, & Ntoumanis, 2008), and a limited base of research related to specialized participation behaviors (McFadden, Bean, Fortier, & Post, 2016; Strachan, Côté, & Deakin, 2009; Wall & Côté, 2007) has examined how an athlete’s choice to specialize or diversify their sport participation has impacted their sport experience. However, this study aimed

to isolate the notion of the *pathway* in its impact of the athletic sport experience, thus prompting the athlete to rate their degree of satisfaction in choosing to specialize (or not) across the three developmental sport levels. According to the tenets of the DMSP and a consensus of findings in youth sport specialization research, those in the early specialization pathway are more at risk for a negative experience (Landers, Carson, & Blankenship, 2010; Malina, 2010; Wiersma, 2000). Though the late specialization pathway does involve a degree of invested specialization as the athlete reaches high school age and commits themselves to the pursuit of elite status attainment, this pathway is also viewed as generally adaptive in balancing the rigors of elite training with a positive psychosocial experience. However, results of this study showed no significant difference of pathways in terms of their pathway experience, suggesting that athletes possess a globally positive expectation to be satisfied by their sport pathway, regardless of whether this involves specializing. When looking at the relative means, however, it was found that the RM pathway rated their pathway satisfaction the highest, followed by LS, and finally ES; though these means were just marginally different (i.e., range was .09), this rank order does support the common school of thought that the ES pathway presents the most risk in promoting a positive and enjoyable pathway experience.

Participation pathway & perceived social enjoyment. Next, the athletes' perceived social enjoyment stemming from their sport experiences was explored in relation to their participation pathways. Though early specialization has been generally posited as less adaptive in the psychosocial domain and there have been some links shown between this pathway and less development of social assets (McFadden et al., 2016; Strachan et al., 2009), there was insufficient previous evidence to make a justified prediction for the relationships between these pathways. The data from this study did not indicate that there was a significant difference

between pathways in regard to their experience of social enjoyment, though this relationship was easily the closest to statistical significance of the four sport pathway experience variables (i.e., $p = .063$). In exploring the means, the LS pathway possessed a notably higher mean rating (i.e., 6.59) than the RM ($M = 6.15$) and ES ($M = 6.12$) groups, once again supporting the notion that the balance of talent and positive youth development associated with the LS pathway may be playing out in the practical pathway experiences of current youth athletes.

Participation pathway & perceived sport competence. A key impetus for the study of sport specialization stemmed from its effectiveness in facilitating the development of athletic expertise (Côté, 1999; Hill & Hansen, 1987; Hill & Simons, 1989; Law, Côté, & Ericsson, 2007). While traditional thinking and the notion of the “10,000 hours prescription” (Ericsson, Krampe, & Tesch-Römer, 1993) may have provided a nudge for elite-striving athletes to specialize early and to a greater degree, the more developmentally grounded DMSP viewed early specialization as riskier in terms of sustained sport experience (Côté et al., 2009). Therefore, athletes who *were* able to maintain their specialized sport pathway across levels could be expected to possess a higher level of perceived sport competence, while those who had chosen to specialize later also fit within an elite outcome track. However, in this study no meaningful differences were found between the pathways in terms of their perceived sport competence, with a very small range of mean ratings between the three pathways. This finding bolsters the argument that early specialization offers no long-term performance advantages or late specialization or continued sampling (Ginsburg et al., 2014; Moesch, Hauge, Wikman, Elbe, 2013), and instead posits all three pathways as potentially facilitative in the development of perceived sport competence.

Participation pathway & burnout. The final variable related to the three classified athlete participation pathways was that of burnout; this negative physical, emotional, and cognitive state was chosen due to its prominence in the youth sport literature, its validated scale, and its link (both empirical and conceptual)(Brenner, 2007; Malina, 2010) to early specialization. No significant pathway differences were found in this study regarding athlete burnout, which implies that early and late specializing athletes who avoid dropping out from sport may be no more likely to experience the negative physical and psychosocial state of burnout than those who adopt continued sampling of multiple sports. However, the rank order of means for these groups was somewhat aligned with previous thinking in that the ES group exhibited the highest mean. Interestingly, the RM group scored slightly higher on the burnout measure than the LS group; this again supports the LS pathway as the most adaptive psychosocial pathway for participants, and also may allude to the potential stress (both physical and psychological) that today's multisport athletes face in the current sport climate.

Perceptions of sport specialization & sport pathway expectations. The next categories of linked variables were the participants' perceptions of sport specialization and their expected experiences resulting from their selected sport pathway; in the previous section the relationship between behaviors (i.e., pathways) and expectations were explored, but in these analyses the relationship between *perceptions* and expectations were explored.

Because these relationships were all explored independent of pathways, relationships between these variables were complex to predict; to clarify, those who rated attitudinal items of specialization more or less favorably still may or may not be adopting a specialized pathway. However, drawing from the preliminary analysis that explored pathway differences in terms of specialization perceptions, it was found that participation pathways did significantly differ in this

regard ($F(2, 123) = 6.82, p = .002$), and the means for the LS and ES groups were notably higher than those of the RM group. Thus, throughout the subsequent interpretations it is reasonably inferred that those who perceived sport specialization more positively are also more likely to have adopted a specialized (ES or LS) pathway.

Perceptions of sport specialization & expectation of sport enjoyment. First, the link between perceptions of sport specialization and sport enjoyment was explored. Though results indicated a non-significant correlation between these two variables, the correlation coefficient of $-.05$ suggested that in terms of the athlete sample as a whole, whether an athlete has more positive or negative perceptions of specialization has little-to-no bearing on their expectation for sport enjoyment.

Perceptions of sport specialization & expectation of social enjoyment. Similar to the expectation of sport enjoyment, there was no clear conceptual or empirical basis for the direction of the relationship between the perceptions of specialization held by the participant and their expectation for social enjoyment. After data analysis a small, negative non-significant relationship was found between these two variables ($r(126) = -.12, p = .194$). The direction of this correlation implies that those who perceive specialization more positively expect a lesser degree of enjoyment from their pathway; this could be due to the current pushback against early youth sport specialization, resulting in this practice being viewed as more of a means of talent development than positive youth development through sport. Combining this finding with the relatively low mean rating for the LS pathway group in terms of their expectation of social enjoyment, it does appear that negative attitudes toward sport specialization have been internalized by currently competing high school athletes.

Perceptions of sport specialization & expectation of performance success. The last variable in this grouping linked the participants' perceptions of sport specialization to their expectation of performance success. Though this relationship was the closest of the three pathway expectation variables in approaching statistical significance, no clear association was found between these two variables while showing only a small, negative directionality ($r(126) = -.14$; $p = .121$). This suggests that those who perceive specialization more positively may possess a lower expectation of performance success stemming from their pathway. Though further research is needed to flesh out the validity of this relationship, it could be the case that those who see specialization as adaptive in developing talent – in conjunction with the perceived pervasiveness of this practice in contemporary youth sports – may in turn view themselves as less likely to succeed in this climate.

Perceptions of sport specialization & sport pathway experiences. The final group of relationships analyzed between the proposed ecological conceptual framework also deals with athletes' perceptions of sport specialization, this time analyzing them in relation to their perceived sport experience as they approach the endpoint of their youth sport pathway. Mirroring the sport expectations section, the analyzed link between sport specialization perceptions and pathways once again creates the need for caution in interpreting these experiential variables; however, due to the presence and prevalence of sport specialization in contemporary youth sport practice and discourse, these variables presented an interesting window into how an athlete's perceptions of specialization may color facets of their sport experience.

Perceptions of sport specialization & perceived pathway satisfaction. In terms of the relationship between perceptions of sport specialization and perceived pathway satisfaction, analysis indicated no relationship between these variables while also being statistically

insignificant ($r(126) = .02$; $p = .842$). Though this was the case, the correlation coefficient suggests that one's perceptions of sport specialization do not relate to their perceived pathway satisfaction; in conjunction with the significant differences of pathways in their perceptions of specialization (i.e., more specialized pathways had more favorable views of specialization), this implies that athletes match their participation pathway to their preference to specialize or diversify to a high degree, and when doing so are able to maintain a positive pathway experience regardless of their selected pathway.

Perceptions of sport specialization & perceived social enjoyment. When considering the link between perceptions of sport specialization and perceived social enjoyment, it is possible that if the prevalence and pressure to specialize are as prominent as sometimes described in popular discourse, that those who ascribe more value to specialization may have a more enjoyable social experience within this climate. However, these variables were not found to be significantly correlated in this study, and the non-relationship indicated by the correlation coefficient suggests that an athlete's social experience through sport is not associated with their perceptions of specialization even in the current climate of high school sport.

Perceptions of sport specialization & perceived sport competence. Next, the correlation of sport specialization and perceived sport competence was found to be small and negative, though statistically insignificant ($r(126) = -.14$; $p = .128$). Because this came the closest to significance of the three sport experience variables created for the study, interpretation of this result is noteworthy; the direction indicates that those who perceive sport specialization more positively view themselves as less competent in sport. Taken in conjunction with the perceived heightened prevalence of specialization in their competition, this finding logically suggests that

in general, athletes view themselves as less capable in comparison to others if they view specializing as more adaptive.

Perceptions of sport specialization & burnout. Finally, the correlation between participants' perceptual ratings of sport specialization and burnout showed a significant, positive relationship of small effect size ($r(126) = .182; p = .042$). Though these two constructs have not been correlated empirically, conceptual work has posited specialization as a risk factor for athlete burnout (Brenner, 2007; Landers et al., 2010; Malina, 2010). Here it appears that those who possess more positive perceptions of specialization (and thus are more likely to adopt these pathways) are also more likely to be burned out. This is also interesting in the context of the professionalized climate of today's youth sport; it could be predicted that those who endorse specialization – anecdotally viewed as a rising trend in today's high school sports – would be better conditioned to avoid being burned out by exposure to this current climate. However, this significant finding instead suggests that when athletes view specializing in a less favorable light, they are at greater risk for becoming burned out – regardless of whether they personally adopt this pathway or not.

Pathway expectation & perceived pathway experience variables. Another limiting feature of the base of youth sport specialization literature has been its reliance on retrospective athlete testimony (e.g., Baker, Côté, & Deakin, 2005; Bridge & Toms, 2013; Ginsburg et al., 2014). Because of this, what is still unknown is the degree to which athletes are having the long-term developmental experiences they expect from adopting their respective participation pathways. The items in this study were designed to elicit critical thinking by athletes of both what they expected as they selected single vs. multisport participation across the three stages of their development, as well as their overarching, multifaceted experiences via their selection as

they approached the end of their youth sport pathway. Therefore, the correlation between this sample's expectations of their pathway (i.e., for sport enjoyment, for social enjoyment, and for performance success) and their perceived pathway experience (i.e., pathway satisfaction, social enjoyment, and perceived sport competence, respectively) were calculated.

Expectation for sport enjoyment & perceived pathway satisfaction. The correlation between the expectation for sport enjoyment and the actual perception of pathway satisfaction was found to be significant with a moderate effect size ($r(128) = .30$; $p = .001$); this illustrates that in the overall sample, athletes' expectations for enjoyment were directly related to their ultimate satisfaction via their pathway, though the size of the effect shows that this match was not universal.

Expectation for social enjoyment & perceived social enjoyment. Looking at how these athletes' selected pathways delivered on the social enjoyment they expected to receive from their participation, a significant positive correlation of moderate effect size indicated that for the most part, they experienced what they anticipated. This finding indicates that regardless of an athlete's selected pathway, they are still likely to experience the positive social benefits afforded by sport participation (e.g., Gould & Carson, 2008; Horn, 2015) that they expect as they progress through these pathways.

Expectation for performance success & perceived sport competence. Lastly, the relationship between athletes' expectations for their pathway to lead to performance success and the actual perception of sport competence towards the end of their development presents some critically important implications. There is no doubt that for athletes and all related youth sport stakeholders, the decision of how to best structure their sport pathway is fraught with difficult choices; even those who aim to follow the most up-to-date recommendations (i.e., Bergeron et

al., 2015; Côté et al., 2009; LaPrade et al., 2016) must trust that their child will not fall behind – and thus be left behind – those who do intensively specialize at an early age. The correlation between these variables in this sample was significant with a moderate positive effect ($r(128) = .47; p < .001$), leading to the understanding that across the three pathways, athletes tend to believe that their development of sport competence via their pathway reflects what they expected as they undertook this pathway. Though further analyses of this relationship (and the other expectation/experience relationships) will be provided in the subsequent set of analyses, these findings as a whole suggest that though not universal, athletes generally are experiencing what they expected as they chose to specialize or diversify across the stages of their athletic participation.

Secondary Exploratory Results

Participation pathway & perceptions of specialization: Contextual characteristic covariates. The significant group differences found between pathways in regard to their average perceptions of specialization served as an important overarching element in interpretation of this study's findings, which indicated that those who held more favorable views of this practice were more likely to ultimately adopt a specialized pathway. However, due to the significant group differences in two of the three contextual characteristic variables (i.e., school size and sport gender), a one-way ANCOVA was conducted to determine if significant group differences of specialization perceptions between participation pathways still existed when these contextual characteristics were controlled. When using each of the three contextual characteristics as covariates individually, significant group differences between pathways still existed and manifested in the same rank order of their means; therefore, though the influence of contextual characteristics appears important in an athlete's perception of sport specialization, these

characteristics do not appear to significantly alter the athlete's likelihood of adopting a pathway that matches their general perceptions of specialization.

Individual characteristics & specialization factors multiple linear regression. In this proposed conceptual framework, individual characteristics (i.e., ability, affect, and agency) were posited as predictive of an athlete's selected participation pathway, as well as their perceptions of specialization. These three factors were found to be interrelated in a preliminary qualitative study (DiSanti, Wright, Chase, & Erickson, in review), thus their combined prediction (and relative contribution of each factor) was examined through a multiple linear regression analysis for both pathways and perceptions. The regression model in predicting participation pathway was found to be significant; moreover, the strongest effect sizes of these three variables were the positive effect of agency (.277), followed by the negative effect of affect (-.215), and lastly the small positive effect of ability (.124)(note, only agency was found to be statistically significant). These results support the notion that these three individual constructs meaningfully predict an athlete's participation pathway, as well as the importance of facilitating internal control of this decision for youth athletes.

Next, the regression equation for perceptions of specialization indicated that these three factors were *not* significantly predictive. The small unstandardized coefficients (Ability = -.021; Affect = .102; Agency = -.060) suggest that these three characteristics exert a minimal impact on perceptions of specialization, though the influence of affect was found to be significant. The significance of affect suggests that when an athlete associates a high degree of affect in their signature sport – especially in relation to potential sport alternatives – that they are more likely to endorse the practice of specialization. This is aligned with emerging thematic results of these individual characteristics (DiSanti et al., in review), and underscores the importance of weighing

levels of enjoyment between sports when selecting whether an athlete should specialize or diversify their participation.

Correlations of pathway expectation & pathway experience variables by pathway groups. This set of analyses sought to explore whether the three participation pathways differed in the degree to which athletes experienced the perceived outcomes that they expected from selecting their respective pathway. In terms of sport enjoyment, all groups showed a positive relationship, though the group who had the closest match between their expectation of sport enjoyment and their pathway satisfaction was the RM group; ES was next, with LS having the lowest degree of agreement between variables. To extrapolate on these relationships, it appears that for the more extreme ends of the pathway spectrum (ES & RM), athletes are more likely to reach the level of enjoyment they expect to receive from their pathway; however, those who specialize later may have a lesser degree of relatedness in terms of these two constructs. This finding is especially noteworthy due to the positioning of the LS pathway as the most balanced and adaptive in the DMSP's framework: If this is the case, then why is there a weaker relationship between an athlete's expectation for enjoyment and their ultimate satisfaction of their pathway?

Next, correlations for social enjoyment were found to be positive for all three groups, but with a large gap between the degree of these relationships. The expectation and experience of social enjoyment exhibited a strong effect size for the RM group, indicating this pathway's strong ability to deliver on the social experience that athletes expected when adopting it; ES athletes also showed a moderate relationship between these two variables; LS athletes, however, did not exhibit a significant relationship and the correlation coefficient was much weaker than in the other two pathways. Once again, this is fascinating in relation to the developmental nature of

the LS pathway: There appears to be an underlying cause in this trajectory that results in a lesser degree of connection between the social enjoyment athletes expect from this pathway, and the social enjoyment they actually experience.

Lastly, the degree to which expectations and experiences of performance success were related was examined for each of the three pathways. Here all three pathway groups were significantly positively correlated with a moderate effect size. When looking at the relative strength of these correlation coefficients between pathways, here it was the LS group that showed the strongest link, while the RM group expressed the lowest correlation between these two variables. This result indicates that the LS pathway is most effective in terms of its ability to effectively develop perceived talent into perceived sport competence (as posited by the DMSP) but may do so while sacrificing a degree of sport and social enjoyment that was expected from adopting this pathway. Though the significant, positive correlations between expectation and experience variables indicate that athletes perceive their multifaceted pathway experience to generally mirror what they expected by adopting these pathways, these notable group variations do challenge some of the pathway-related assumptions put forth previously in the sport specialization literature.

Theoretical Model Implications

Developmental Model of Sport Participation (DMSP). The DMSP has long provided a stable, empirically backed framework for youth sport stakeholders to follow in their quest to facilitate a positive, developmentally appropriate experience for youth athletes. The three major pathways outlined in this model (ES, LS, or RM) are associated with a multitude of implications related to the on- and off-field development of the athletes who adopt them. The thorough exploration of these variables in this study sought to break down some of the assumptions of this

model to determine how the prescribed pathways manifest in currently competing athletes in today's culture of youth sport.

It should first be noted that the full scope of DMSP goes beyond the dichotomous classification of “specialization” or “diversification,” also elucidating elements of the athlete's psychosocial experience and their style of training/competition (i.e., free play, deliberate play, etc.) However, for the sake of brevity in this study's already complicated conceptual heuristic, pathways were distilled to the athlete's simple “yes/no” perception of themselves as specializing across the three levels of the DMSP. However, elements of sport pathway expectations and sport pathway experiences aimed to reflect the athlete's trajectory from more of a developmental perspective, thus allowing the results to uncover several important implications in regard to the assumptions of this model.

First it was notable that the majority of participants in this study (73.4%) viewed themselves as specializing in a signature sport during their high school sport participation. ES and LS pathways are viewed as most adaptive for those who are seeking elite sport performance (Baker et al., 2003), and with the practical reality that most of these high school athletes will *not* go on to participate at a higher competitive level, this frequency of specializing athletes seems excessively high. This suggests that it may be time to rethink or reframe implications associated with the LS pathway: Athletes may not be looking to reach an elite level of performance among the high school athlete population, but instead be looking to reach an elite level of performance among their own sport capabilities.

Moreover, examining the average number of sports played and currently playing by the participation pathway groups in this sample underscored the problematic conceptualization of specialization as simply “playing one sport” (Bridge & Toms, 2013; Coutinho et al., 2016). All

three pathways averaged more than one sport played even during their high school years when many self-identified as “specialized;” thus, incorporating more perception-based markers of specialized participation would greatly aid in understanding of the psychosocial aspects and outcomes stemming from varied specialized statuses.

In looking at the significant group differences and notable mean orders of the participation pathways, several of these exploratory analyses presented important implications for the interpretation and application of the DMSP. In terms of ability, it is notable that the LS group expressed the highest mean rating; though the item was intended to survey their perception of ability *throughout* their pathway process, this could also reinforce the model’s assertion that late specialization after early sampling leads to superior performance. Additionally, it is possible that athletes who had a stable foundation in their perceived ability trusted the LS pathway to develop their talent over the long-term, even if some of their peers specialized earlier. Mean ratings of affect showed that the pathways who ultimately specialized (ES and LS) had a larger gap in their affect associated with their signature sport in comparison to potential sport alternatives, implying that those who do develop a strong preference towards a single sport are more likely to specialize in it, regardless of if this happens earlier or later. Finally, in terms of agency, the finding that RM participants exhibited the highest internal agency, followed by LS, with ES participants rating agency as most externally driven, suggests that when allowed the opportunity to structure their own pathway, athletes are more likely to prefer multisport participation. Though this finding was not statistically significant, these mean ratings fortify the argument that in order to ensure a developmental, athlete-driven system of sport participation, greater affordances for multisport participation need to be made in today’s sport systems – potentially even for elite-striving athletes.

Interestingly, there were no significant group differences yielded by the one-way ANOVAs in terms of the pathway expectation and pathway experience variables. In the DMSP, it is assumed that certain pathways (i.e., ES and LS) are accompanied by a heightened expectation and subsequent experience of elite sport performance, while the RM pathway is associated with a more enjoyable, less performance-oriented experience. These non-significant differences challenge the assumptions of these pathways, instead implying that the three pathways mix all types of athletes in terms of their multidimensional aspirations and experiences.

Notably, the matched pairs of pathway expectation and pathway experience variables were all significantly positively correlated. However, the effect size of relationships between variables differed when separated by participation pathway. In this regard, the LS pathway had the weakest relationship of the three pathways between both expectation of sport enjoyment and perceived pathway satisfaction, as well as expectation of social enjoyment and perceived social enjoyment. To speculate, it is possible that the optimal adaptiveness of the LS pathway opined by the DMSP is still in fact the case; however, if athletes begin on a non-specialized pathway and then transition into specialized participation (either via external pressures or due to internal drive for elite performance), this may be the underlying cause of the weaker link between expectations and experiences. Where athletes who specialize early (ES) or don't specialize at all (RM) are delivered the level of enjoyment they expected from maintaining the pathway they intended, those in LS may be less likely to follow through in this regard. Prospective research designs or explicit, qualitative investigations of this particular issue could prove fruitful in understanding the degree to which athletes maintain or alter the pathway trajectories they intend to take throughout their youth sport careers.

Person-Process-Context-Time (PPCT) model.

Person. Though the behaviors of individuals and assets they come to possess (i.e., elite performance) have been previously related to sport pathway characteristics (especially early vs. late specialization and age of specialization onset)(e.g., Baker et al., 2005; Ginsburg et al., 2014; Soberlak & Côté, 2003; Starkes, Deakin, Hodges, Allard, & Hayes, 1996), work linking multidimensional personal assets to athletes' sport participation pathway selection and perceptions of sport specialization has lacked in the research. In this study, the preliminary work of the author to use athlete-generated themes related to their pathway selection (i.e., DiSanti et al., in review) formed the conceptual rationale for the inclusion of ability, affect, and agency as markers of personal characteristics influencing their pathway selection and subsequent experience. These variables served as a cursory representation of the “demand” (i.e., ability), “resource” (i.e., affect), and “force” (i.e., agency) constructs that equip an athlete to act and interact with their surrounding systems. It is important to acknowledge that these variables were measured cross-sectionally, and therefore they may not represent these personal entities across development, rather only at the end of the development. However, the previously discussed significant relationships and relative mean differences between groups in regard to these personal attributes warrants further exploration of how the person interacts within their environment over time.

Process. Though the majority of studies related to youth sport specialization have used cross-sectional or retrospective designs to survey the relationship between athlete participation behaviors and their sport outcomes (DiSanti & Erickson, 2019), more conceptual work in this area has posited this as a developmental phenomenon that manifests across the athlete's span of participation (Horn, 2015). Therefore, process-oriented research of sport pathways presents a

ripe opportunity for filling in notable gaps of knowledge related to this topic (DiSanti & Erickson, in review). In this study, the explicit defining and use of the athlete's "pathway" aimed to account for process-based development. This allowed the athlete to think about the transition points between elementary school, middle school, and high school sports, while also reflecting on how this overall process linked their individual and contextual characteristics. Additionally, the emphasis on perceptions in the testing battery was intended to reflect proximal processes; how does their sport participation process connect themselves (i.e., "person") to their environment ("context") through the reading, reaction, and interactions over time via their participation pathway? Lastly, the link between sport pathway expectations and sport pathway experiences was a novel process-based methodology that sought to better understand the degree to which athletes get what they expect as they move through their sport pathways. Results of this study indicated that in general, these expectations and experiences are positively related; however, different pathways of the DMSP and different strengths of correlations make clear that more research with a process-focused eye is critical for further fleshing out an ecological understanding of sport specialization.

Context. Though previous research has parsed apart initial relationships between elements such as sport gender (Post, Trigsted et al., 2017; Post, Bell et al., 2017), sport type (i.e., individual vs. team-based)(Buckley et al., 2017), and school size (Bell et al., 2016; DiSanti, Post, Bell, & Erickson, 2019), combining these elements and situating them within the larger conceptual framework put forth in this study allowed for novel depth in the relationships between these variables and characteristics of sport pathway selections and experiences to be more clearly understood. Though interpretation of these contextual factors has already provided some interesting findings regarding group differences and groups' relative mean ratings,

comparing the results of this study in conjunction with previous literature underscore the importance of context even more so. Though contextual characteristics were surveyed in the current study, an important aspect of treating these variables in an ecological sense would ideally involve an optimal balance of consistency and variation for each contextual group, creating a meaningful “playing field” for athletes to read, react, and interact to. However, due to the convenience sampling relied upon for recruitment in this study, it is possible that salient characteristics of the teams and schools comprising a large proportion of each group (e.g., Class C athletes were comprised almost exclusively by male ice hockey players from one school) outweighed the contextual effects found in previous research that may have been found with a more contextually diverse sample. Therefore, those in charge of structuring youth sport programs and promoting messaging and behaviors related to single vs. multisport participation should embrace their role in shaping the climate in which athletes participate, as the trickle-down effect they impose can make a significant impact on the perceptions and behaviors of youth athletes beyond the broader characteristics of their context.

Time. The heuristic put forth by the conceptual model sought to use a developmental approach in understanding sport participation pathways yet did so through a cross-sectional design. Though these characteristics could be potentially presented as contradictory, the items were carefully framed to account for the developmental scope of this study in their time orientation. For example, expectation/experiential items were worded to reflect the participant’s perception *throughout* the time of their participation pathway (e.g., “over the course of your participation,” “as you progressed through your sport pathway...”), rather than as a static entity at the endpoint of their pathway. Though this was seen as the most efficient option to account for the timescale in the current study, it is also quite likely that these perceptions were sensitive to

time-related influences, thus future research should seek to take a more longitudinal approach in which these potential shifts and alterations can be better accounted for. Moreover, elements of micro- and meso-time (e.g., time spent in practice competition; time spent in the club vs. high school context; overlap between seasons) were not accounted for in this study. These latter weaknesses would make for fascinating and potentially impactful future research questions, especially if conducted with diverse samples and in a longitudinal or prospective fashion.

Limitations & Methodological Considerations

The exploratory nature of this study allowed for a wide variety of relationships to be examined and situated within the larger scope of sport specialization research. However, it is also important to acknowledge several limitations in the knowledge gained and application of these findings, while also highlight several methodological considerations which help better contextualize these findings.

Potentially the most limiting feature of this study in the interpretation and application of its results was the reliance on convenience sampling of large team/school cohorts. Because many of the analyses were group-based the potential homogeneity of these groups calls into question the degree to which they represented an average participant's experience within said context. This becomes even more important to consider when critically analyzing the characteristics of these teams; for example, two female teams from one Class A school participated in this study, and the coach who served as a point-of-contact was also a member of MHSAA's Multisport Task Force. Previous research has shown large schools and female athletes to be more likely to specialize, but it is quite possible that the messaging and climate of this school that explicitly aims to promote multisport participation may have been responsible for the non-significant findings in this regard.

Also related to the athlete sample in this study, though recruitment was aimed to involve a balanced proportion of participant group characteristics, the low response rate limited the ability to do so. Therefore, the demographic and sport background characteristic groups did not end up as balanced as intended (notably, a large difference was present between school size classifications and signature sport classification). However, it can also be logically inferred that some of these skewed proportions may be a reasonably reflective of proportions in the high school athlete population. For example, the sample's notably larger frequency of athletes in large schools makes sense in relation to the larger student populations at these schools, even if they exhibited similar recruitment rates as smaller size schools. Methodological consideration and purposive recruitment of balanced athlete samples would aid in parsing out significant differences between groups, and the lack of these qualities may have impacted the non-significant group differences found in the current study.

Next the nature of the variables involved in this study posed a degree of difficulty in selecting representative scales and items for this testing battery. Previous research of youth sport participants has provided limited methodological tools for measuring participants' long-term expectations stemming from their sport participation. Moreover, these tools do not account for these expectations across the scope of their developmental pathway. Selected variables may be conceptual similar but use slightly incongruent terminology to measure relationships (e.g., expectation for sport performance and perceived sport competence). Additionally, the many independent statistical analyses conducted on this same data set presents an increased risk of type I error (false positives); however, due to the exploratory and hypothesis-*generating* nature of this study, this consideration is noted but justified in order to avoid shutting down potentially fruitful avenues for future research. Therefore, these findings should be interpreted with caution and

consideration, and increasingly nuanced and more rigorously validated measures should be employed in further iterations of this ecological conceptual framework.

In this study, the participants were measured during their high school years so that as they approached the end of this previously outlined youth sport participation timespan (i.e., Côté, 1999), they were able to provide a more complete reflection of how their perceptions of their ecology, participation characteristics, and experiences interrelated across development. However, it is also important to consider that due to the cross-sectional design of the study that these perceptions are static, and do not account for how they may have shifted (or maintained) across the different levels of their participation (i.e., early youth sport, middle school sport, high school sport).

In terms of theory, it should be acknowledged that in a truly complete ecological model, there also would be a connecting arrow between “individual factors” and “contextual factors,” i.e., at this ecological factor level, it is likely that the athlete’s perceptions of their personal assets will influence their perceptions of the sport-related features of their environment (and vice versa). However, due to the inconsistency of the nature of variables in these two groupings and the lack of clear conceptual connections in the sport specialization research, no analysis was conducted in this regard. However, future research could delve into these connections in relation to pathway selection and sport specialization – perhaps an even more parsimonious way of gleaned new information regarding the link between a youth athlete’s ecology and characteristics of their sport participation.

Athletes described whether they specialized or not based on a dichotomous, operationally defined perception of their status during elementary school, middle school, and high school. These simplified items were selected in order to concisely define the athletes’ pathway across the

three stages of their participation; however, more nuanced, “degrees” of specialization scales have been put forth as well (Jayanthi et al., 2014). Therefore, more complex analyses of how degree of specialization manifests across pathways would be beneficial, as well as further depth in terms of theory and implications for these variations in participant pathways.

Additionally, though the “signature sport type” was split between individual and team sports due to this distinction’s previous significance in research (Buckley et al., 2017), it is possible that sport-specific climates may be salient in influencing the variables in this conceptual ecological model. Though the results of this study treated each category of sport as a salient marker of sport context, it is also important to acknowledge that each sport may possess a specific climate and associated demands which influence participation pathways and subsequent experiences, and this becomes even more important when accounting for the potential within-cohort effects that may have manifested in this study.

In terms of the expectations and perceived experience variables, the study was designed (and subsequently analyzed) to match each of the developmental expectancy facets (sport enjoyment, social enjoyment, performance success) to an isolated perceived pathway experiential variable (pathway satisfaction, social enjoyment, and sport competence, respectively). However, in practical terms it seems likely that some of these aspects would cross-pollenate into variables outside of these explicit pairings; for example, the affective impact of a youth athlete’s expectation for their pathway to lead to enjoyment in their signature sport would also likely impact their perception of social enjoyment throughout their participation. Further inquiry into the link between expectations and experiences should be conducted in order to better flesh out these relationships.

Even with these limitations and methodological considerations, the exploratory nature of this study and novelty of its measures, design, and interpretation within the literature have created to an enhanced ecological understanding of sport participation pathways related to sport specialization. Perhaps even more importantly, critical analysis of these results and the characteristics of the study provide many interesting future directions for further enhancing this area of youth sport knowledge.

Future Research Directions

Though no hypothesized directions or degree of relationships between variables in the conceptual model were put forth, this dissertation's results – including both the findings that were significant, as well as those that were not – can be incorporated into the still budding base of sport specialization literature and theory to illuminate multiple avenues of continued inquiry.

First, from an ecological sense, this study did survey athletes' views regarding the influence of their surrounding social actors and environment but did so in isolation. Ecological research which better details the social systems through concurrent investigation of multiple stakeholder roles (e.g., parents, siblings, peers, coaches, etc.) would create a much deeper understanding of sport specialization through the PPCT framework. Additionally, more nuanced detail regarding the process of participation pathways could be learned by using a more complex method of pathway classification. As mentioned earlier, one measure in this regard uses three items to identify the “degree of specialization” for an athlete (Jayanthi et al., 2014); using this gradient scale in conjunction with the three stage “pathways” outlined in this study could improve the degree of integrity by which pathways are defined.

Though there has already been some speculation regarding the significant results (or lack thereof) found in this study, due to the exploratory focus of the study, a few specific findings

present a new foundation and impetus for further research of this topic. First, in terms of participation pathways, it was interesting that the three individual characteristic variables did not significantly differ by group but did significantly explain group membership through a regression equation when pathway was treated as a continuous scale (i.e., from more to less specialized). Moreover, though not significant, the rank ordering of means for each pathway group allow for preliminary predictions to be made regarding the nature of the relationships between these groups – some of which have already been detailed in terms of their relation to assumptions and tenets of the DMSP. For example, the ES pathway rated their perceived ability the lowest on average; using more focused designs and more rigorous measures, this unexpected finding could be further explored to determine if indeed athletes who specialize early feel less confident in their ability even after this heightened training and competition load.

Though the measures and items created for the sake of this study do come with certain limitations, there were also several promising elements of the design that can be used in this ongoing line of research. For example, the “affect” item was novel in that it prompted the participant to identify the gap in their affective experience between their signature sport and potential sport alternatives. This item was significantly positively correlated to perceptions of specialization and may provide a more practical way of determining the degree to which sport specialization is adaptive for an individual athlete. Additionally, the pathway identification process used in this study is a succinct way of outlining a participant’s developmental trajectory even in retrospective designs; this method can be used further in prospective or longitudinal designs as well, and the significant link found between perceptions and pathway group presents a clearer conceptual understanding of how these two elements relate in future research.

Lastly, the small number of significant group differences in this study draws into question the importance of contextual characteristics and participation pathways in relation to individual perceptions, expectations, and experiences. These non-significant differences can be tested in future research to determine if participation pathways are more similar than different, as this study would indicate; however, due to the sample considerations mentioned previously, it is also possible that a more diverse, less clustered sample would support significant relationships of the variables in the proposed conceptual framework. If it is the case that the cultural impact of the cohorts involved in this study outweighed the general contextual impact related to participation pathways, then these schools and teams could serve as a meaningful source of information regarding the effective shaping of multisport youth programs.

Conclusion

This study served as a critical next step in accumulating the various strands of research by which recommendations and interpretations of youth sport participation pathways have been explored and applied. Though the findings are intentionally interpreted with a healthy degree of caution, the design and scope of this study were methodically planned and executed to aim for an enhanced understanding of the ecology of youth sport participation pathways, as well as to serve as hypothesis-generating launching point for future research. Though the lack of significant relationships in this model leave much to explore in regard to a parsimonious representation of youth sport pathways and experiences, the relationships (or lack thereof) provided many implications for practical application and future research. As the field continues to deepen the degree of knowledge and develop the methodological toolkit for measuring and interpreting sport participation pathways, this study can serve as a conceptual building block and the results can be interpreted in an iterative fashion. Through this process, sport researchers and practitioners can

better understand how, when, and why youth athletes choose to specialize, and can provide increasingly practical guidance for how these pathways relate to their ultimate sport experience.

APPENDICES

APPENDIX A

IRB Approval

MICHIGAN STATE UNIVERSITY

Initial Study APPROVAL Revised Common Rule

March 27, 2019

To: Karl Erickson

Re: **MSU Study ID:** STUDY00002301
IRB: Social Science / Behavioral / Education Institutional Review Board
Principal Investigator: Karl Erickson
Category: Expedited 7
Submission: Initial Study STUDY00002301
Submission Approval Date: 3/26/2019
Effective Date: 3/26/2019
Study Expiration Date: **None; however modification and closure submissions are required (see below).**

Title: An initial ecological exploration of youth sport participation pathways

This submission has been approved by the Michigan State University (MSU) Social Science / Behavioral / Education Institutional Review Board. The submission was reviewed by the Institutional Review Board (IRB) through the Non-Committee Review procedure. The IRB has found that this study protects the rights and welfare of human subjects and meets the requirements of MSU's Federal Wide Assurance (FWA00004556) and the federal regulations for the protection of human subjects in research (e.g., 2018 45 CFR 46, 21 CFR 50, 56, other applicable regulations).



**Office of
Regulatory
Affairs**
Human Research
Protection Program

4000 Collins Road
Suite 136
Lansing, MI 48910

517-355-2180
Fax: 517-432-4503
Email: irb@msu.edu
www.hrpp.msu.edu

How to Access Final Documents

To access the study's final materials, including those approved by the IRB such as consent forms, recruitment materials, and the approved protocol, if applicable, please log into the Click™ Research Compliance System, open the study's workspace, and view the "Documents" tab. To obtain consent form(s) stamped with the IRB watermark, select the "Final" PDF version of your consent form(s) as applicable in the "Documents" tab. Please note that the consent form(s) stamped with the IRB watermark must typically be used.

Expiration of IRB Approval: The IRB approval for this study does not have an expiration date. Therefore, continuing review submissions to extend an approval period for this study are not required. **Modification and closure submissions are still required (see below).**

Modifications: Any proposed change or modification with certain limited exceptions discussed below must be reviewed and approved by the IRB prior to implementation of the change. Please submit a Modification request to have the changes reviewed.

APPENDIX B:

Summary of Testing Battery

Table A.1.

Summary of Testing Battery

Measure	Model Variables Addressed	# of Items	Possible Responses/ Scale Range
<i>Sport Participation Questionnaire*</i>	Participation Pathway	3 items (Elementary School, Middle School, High School)	Yes or No
	Signature Sport Type	1 item	Open-ended
	School Size	1 item	Class 1-4
	Sport Gender	1 item	Male or Female
<i>Trait Sport Confidence Inventory</i>	Ability	13 items	1-9
<i>Comparison of Sport Affect Item*</i>	Affect	1 item	1-5
<i>Control of Pathway Selection Items*</i>	Agency	3 items	1-4
<i>Youth Sport Specialization Perception Scale</i>	Perceptions of Sport Specialization	25 items	1-4
<i>Pathway Expectation Items*</i>	Expectation of Sport Enjoyment	1 item	1-7
	Expectation of Social Enjoyment	1 item	1-7
	Expectation of Performance Success - HS	1 item	1-7
	Expectation of Performance Success – HS+	1 item	1-7
<i>Pathway Satisfaction Items*</i>	Perceived Pathway Satisfaction	1 item	1-4
	Perceived Social Enjoyment	4 items	1-4
	Perceived Performance Success	3 items	1-4
<i>Athletic Burnout Questionnaire</i>	Burnout	15 items	1-5

**Designed for the proposed study*

APPENDIX C:
Full Testing Battery

SPORT PARTICIPATION QUESTIONNAIRE

Please complete the following questions to describe your personal characteristics and sport history:

1. What is your age? _____
2. What grade are you currently in? _____
3. Do you play for a male or female team? Male _____ Female _____
4. What classification of high school do you attend? (Please circle one)

Class A *Class B* *Class C* *Class D*
5. How many sports have you played for an organized high school or club team? _____

Please list these sports below:

- 1) _____
- 2) _____
- 3) _____
- 4) _____
- 5) _____

6. How many sports do you **currently** play for an organized high school or club team? _____

Please list these sports below:

- 1) _____
- 2) _____
- 3) _____

4) _____

5) _____

7. What is your *signature* sport? (that is, if you **had to** quit all other sports and only play one, what would it be)

Sport specialization is defined as training and competition in a single sport for more than 8 months a year, while excluding other potential sport options; please check one option for each of the options in the question below:

8. Did (do) you specialize in your signature sport during...

a. Elementary School?	Yes	_____	No	_____
b. Middle School?	Yes	_____	No	_____
c. High School?	Yes	_____	No	_____

Think about how self-confident you are when you compete in sport. Answer the questions on the following pages based on how confident you generally feel when you compete in your sport. Compare your self-confidence to the most self-confident athlete you know.

Please answer as you really feel, not how you would like to feel. Your answers will be kept completely confidential.

1-low

5-medium

9-high

9. Compare your confidence in YOUR ABILITY TO EXECUTE THE SKILLS NECESSARY TO BE SUCCESSFUL to the most confident athlete you know. 1 2 3 4 5 6 7 8 9

10. Compare your confidence in YOUR ABILITY TO MAKE CRITICAL DECISIONS DURING COMPETITION to the most confident athlete you know. 1 2 3 4 5 6 7 8 9

11. Compare your confidence in YOUR ABILITY TO PERFORM UNDER PRESSURE to the most confident athlete you know. 1 2 3 4 5 6 7 8 9

12. Compare your confidence in YOUR ABILITY TO EXECUTE SUCCESSFUL STRATEGY to the most confident athlete you know. 1 2 3 4 5 6 7 8 9

13. Compare your confidence in YOUR ABILITY TO CONCENTRATE WELL ENOUGH TO BE SUCCESSFUL to the most confident athlete you know. 1 2 3 4 5 6 7 8 9

14. Compare your confidence in YOUR ABILITY TO ADAPT TO DIFFERENT GAME SITUATIONS AND STILL BE SUCCESSFUL to the most confident athlete you know. 1 2 3 4 5 6 7 8 9

15. Compare your confidence in YOUR ABILITY TO ACHIEVE YOUR COMPETITIVE GOALS to the most confident athlete you know. 1 2 3 4 5 6 7 8 9

16. Compare your confidence in YOUR ABILITY TO BE SUCCESSFUL to the most confident athlete you know. 1 2 3 4 5 6 7 8 9

- | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 17. Compare your confidence in YOUR ABILITY TO CONSISTENTLY BE SUCCESSFUL to the most confident athlete you know. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 18. Compare your confidence in YOUR ABILITY TO THINK AND RESPOND SUCCESSFULLY DURING COMPETITION to the most confident athlete you know. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 19. Compare your confidence in YOUR ABILITY TO MEET THE CHALLENGE OF COMPETITION to the most confident athlete you know. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 20. Compare your confidence in YOUR ABILITY TO BE SUCCESSFUL EVEN WHEN THE ODDS ARE AGAINST YOU to the most confident athlete you know. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 21. Compare your confidence in YOUR ABILITY TO BOUNCE BACK FROM PERFORMING POORLY AND BE SUCCESSFUL to the most confident athlete you know. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Earlier in this survey, you were asked to identify your *signature* sport (the sport you would choose if you had to quit all others and play only one).

22. In comparison to other sports, how much do you like your signature sport? (Please circle one response)

Much less	A little less	About the same	A little more	Much more
1	2	3	4	5

The following questions relate to your sport participation pathway – meaning whether you specialized in one sport or played multiple sports – from elementary school through high school. Please rate the following questions from 1 (not at all) to 4 (very much)

23. Over the course of your sport participation, to what degree was your pathway within your control?

1	2	3	4
----------	----------	----------	----------

24. Over the course of your sport participation, to what degree was your pathway influenced by the people around you (such as your parents, siblings, friends, coaches, etc.)?

1

2

3

4

25. Over the course of your sport participation, to what degree was your pathway influenced by your environment?

1

2

3

4

Sport specialization is defined as training and competition in a single sport for more than 8 months a year, while excluding other potential sport options. The questions below are related to the concept of sport specialization. Please choose the option that you feel best applies to your views of sport specialization for each item:

	1- Strongly Disagree	2-Disagree	3-Agree	4-Strongly Agree
1) All athletes should specialize in one sport by the time they reach high school.	1	2	3	4
2) Coaches pressure athletes to participate in only one sport.	1	2	3	4
3) High school athletes can only be successful if they train and compete year-round in one sport.	1	2	3	4
4) I believe high school athletes should specialize in one sport.	1	2	3	4
5) Specialization makes sense for talented athletes who seek to participate at higher levels.	1	2	3	4
6) Athletes who specialize in one sport are more skilled than their teammates who participate in multiple sports.	1	2	3	4
7) Athletes who specialize in one sport are more likely to have an enjoyable sport experience than athletes who participate in multiple sports.	1	2	3	4
8) If it were entirely up to athletes, they would choose to participate in more than one sport.	1	2	3	4
9) Specializing in one sport takes away from athletes' abilities to enjoy other activities.	1	2	3	4
10) College coaches prefer athletes to participate in more than one sport.	1	2	3	4
11) Specializing in one sport is the best choice for all athletes when they reach high school.	1	2	3	4
12) A more effective model for sport participation is to encourage athletes to participate in multiple sports and activities through high school.	1	2	3	4
13) Teams that include athletes who specialize in that sport will be more successful than teams with athletes who participate in multiple sports.	1	2	3	4

14) Athletes are less likely to be selected for a team if they play multiple sports.	1	2	3	4
15) If it were up to parents, athletes would participate in more than one sport by the time they reach high school.	1	2	3	4
16) All athletes should have the option of participating in multiple sports throughout their high school years.	1	2	3	4
17) Participation in more than one sport can help an athlete be more successful in his or her favorite sport.	1	2	3	4
18) High school athletes would like for their teammates to participate only in that sport.	1	2	3	4
19) Athletes should participate in the one sport that gives them the best chance of participating in that sport in college.	1	2	3	4
20) Athletes who specialize in one sport experience more burnout than athletes who participate in multiple sports.	1	2	3	4
21) Specializing in one sport leads to athletes loving their sport more.	1	2	3	4
22) It is impossible to fully develop an athlete's talent if s/he doesn't specialize in one sport by the time they reach high school.	1	2	3	4
23) Specializing in one sport can lead to overuse injuries and mental fatigue.	1	2	3	4
24) Only athletes who have the talent and motivation to seek college or elite athlete status should specialize in one sport.	1	2	3	4
25) Specializing in one sport is the best option for those participating in high school sport.	1	2	3	4

The following questions relate to your sport participation pathway – meaning whether you specialized in one sport or played multiple sports – from elementary school through high school. Please rate the following questions from 1 (not at all) to 7 (very much)

As you progressed through your sport pathway (from Elementary School, to Middle School, to High School), to what degree did you expect that your sport participation would lead to...

1) An enjoyable sport experience?

1 2 3 4 5 6 7

2) An enjoyable social experience?

1 2 3 4 5 6 7

3) Successful performance in High School sports (For example, making a team, receiving playing time, winning championships or awards, etc.)?

1 2 3 4 5 6 7

4) Successful performance *beyond* High School sports (For example, playing in college, receiving a scholarship, playing professionally, etc.)?

1 2 3 4 5 6 7

5) As you reflect back, to what degree are you satisfied with your participation pathway?

1 2 3 4 5 6 7

6) As you reflect back, to what degree has your participation pathway led to an enjoyable social experience?

1 2 3 4 5 6 7

7) As you reflect back, to what degree has your participation pathway led to successful sport performance?

1 2 3 4 5 6 7

Please circle the number you feel best applies to you for your signature sport, rating each number from 1-5:

- 1 = almost never
- 2 = rarely
- 3 = sometimes
- 4 = frequently
- 5 = almost always

1. I'm accomplishing many worthwhile things in my sport:

1 2 3 4 5

2. I feel so tired from my training that I have trouble finding energy to do other things:

1 2 3 4 5

3. The effort I spend in my sport would be better spent doing other things:

1 2 3 4 5

4. I feel overly tired from my sport participation:

1 2 3 4 5

5. I am not achieving much in my sport:

1 2 3 4 5

6. I don't care as much about my sport performance as I used to:

1 2 3 4 5

7. I am not performing up to my ability in my sport:

1 2 3 4 5

8. I feel "wiped out" from my sport:

1 2 3 4 5

9. I'm not into my sport like I used to be:

1 2 3 4 5

10. I feel physically worn out from my sport:

1 2 3 4 5

11. I feel less concerned about being successful in my sport than I used to:

1 2 3 4 5

12. I am exhausted by the mental and physical demands of my sport:

1 2 3 4 5

13. It seems that no matter what I do, I don't perform as well in my sport as I should:

1 2 3 4 5

14. I feel successful at my sport:

1 2 3 4 5

15. I have negative feelings toward my sport:

1 2 3 4 5

REFERENCES

REFERENCES

- Adie, J. W., Duda, J. L., & Ntoumanis, N. (2008). Autonomy support, basic need satisfaction and the optimal functioning of adult male and female sport participants: A test of basic needs theory. *Motivation and Emotion*, 32(3), 189-199.
- Araujo, D., & Davids, K. (2009). Ecological approaches to cognition and action in sport and exercise: Ask not only what you do, but where you do it. *International Journal of Sport Psychology*, 40(1), 5.
- Baker, J., Cobley, S., & Fraser-Thomas, J. (2009). What do we know about early sport specialization? Not much!. *High Ability Studies*, 20(1), 77-89.
- Baker, J., Cote, J., & Abernethy, B. (2003). Sport-specific practice and the development of expert decision-making in team ball sports. *Journal of Applied Sport Psychology*, 15(1), 12-25.
- Baker, J., Côté, J., & Deakin, J. (2005). Expertise in ultra-endurance triathletes: Early sport involvement, training structure, and the theory of deliberate practice. *Journal of Applied Sport Psychology*, 17(1), 64-78.
- Baker, J., & Robertson-Wilson, J. (2003). On the risks of early specialization in sport. *Physical & Health Education Journal*, 69(1).
- Balyi, I., & Hamilton, A. (2004). Long-term athlete development: Trainability in childhood and adolescence. *Olympic Coach*, 16(1), 4-9.
- Barreiros, A., Côté, J., & Fonseca, A. M. (2013). Training and psychosocial patterns during the early development of Portuguese national team athletes. *High Ability Studies*, 24(1), 49-61.
- Barynina, I., & Vaitsekhovskii, S. (1989). The aftermath of early specialization for highly qualified swimmers. *Fitness Sports Review International*, 6, 21-23.
- Becker, A. J., & Solomon, G. B. (2005). Expectancy information and coach effectiveness in intercollegiate basketball. *The Sport Psychologist*, 19(3), 251-266.
- Bell, D. R., Post, E. G., Trigsted, S. M., Hetzel, S., McGuine, T. A., & Brooks, M. A. (2016). Prevalence of sport specialization in high school athletics: A 1-year observational study. *The American Journal of Sports Medicine*, 44(6), 1469-1474.
- Bergeron, M. F., Mountjoy, M., Armstrong, N., Chia, M., Côté, J., Emery, C. A., ... & Malina, R.

- M. (2015). International Olympic Committee consensus statement on youth athletic development. *British Journal of Sports Medicine*, 49(13), 843-851.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Bloom, B. S. (1985). *Developing talent in young people*. New York, NY: Ballantine Books.
- Branta, C. F. (2010). Sport specialization: Developmental and learning issues. *Journal of Physical Education, Recreation & Dance*, 81(8), 19-28.
- Brenner, J. S. (2007). Overuse injuries, overtraining, and burnout in child and adolescent athletes. *Pediatrics*, 119(6), 1242-1245.
- Bridge, M. W., & Toms, M. R. (2013). The specialising or sampling debate: a retrospective analysis of adolescent sports participation in the UK. *Journal of Sports Sciences*, 31(1), 87-96.
- Bronfenbrenner, U. (1979). *The ecology of human development: Experiments by nature and design*. Cambridge, MA: Harvard University Press.
- Bronfenbrenner, U. (1988). Interacting systems in human development. Research paradigms: Present and future. In N. Bolger, A. Caspi, G. Downey, & M. Moorehouse (Eds.), *Persons in context: Developmental processes* (pp. 25 – 49). Cambridge, UK: Cambridge University Press.
- Bronfenbrenner, U. (1994). Ecological models of human development. In T. Husen & T. N. Postlethwaite (Eds.), *International encyclopedia of education* (2nd ed., Vol. 3, pp. 1643 – 1647). Oxford, UK: Pergamon Press.
- Bronfenbrenner, U., & Ceci, S. J. (1994). Nature-nurture reconceptualized in developmental perspective: A biological model. *Psychological Review*, 101, 568 – 586.
- Bronfenbrenner, U., & Morris, P. A. (1998). The ecology of developmental processes. In W. Damon & R. M. Lerner (Eds.), *Handbook of child psychology, Vol. 1: Theoretical models of human development* (5th ed., pp. 993 – 1023). New York: Wiley.
- Bronfenbrenner, U., & Morris, P. A. (2005). The bioecological model of human development. In W. Damon & R.M. Lerner (Eds.), *Handbook of child psychology* (6th ed., pp. 793 – 825). New York: Wiley.
- Buckley, P. S., Bishop, M., Kane, P., Ciccotti, M. C., Selverian, S., Exume, D., ... & Ciccotti, M.

- G. (2017). Early single-sport specialization: A survey of 3090 high school, collegiate, and professional athletes. *Orthopaedic Journal of Sports Medicine*, 5(7), 2325967117703944.
- Coakley, J. (2010). The “logic” of specialization: Using children for adult purposes. *Journal of Physical Education, Recreation & Dance*, 81(8), 16-25.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155.
- Côté, J. (1999). The influence of the family in the development of talent in sport. *The Sport Psychologist*, 13(4), 395-417.
- Côté, J., Baker, J., & Abernethy, B. (2003). From play to practice. *Expert performance in sports: Advances in research on sport expertise*. Chicago, IL: Human Kinetics, 89-113.
- Côté, J., Baker, J., & Abernethy, B. (2007). Practice and play in the development of sport expertise. *Handbook of Sport Psychology*, 3, 184-202.
- Côté, J., Lidor, R., & Hackfort, D. (2009). ISSP position stand: To sample or to specialize? Seven postulates about youth sport activities that lead to continued participation and elite performance. *International Journal of Sport and Exercise Psychology*, 7(1), 7-17.
- Coutinho, P., Mesquita, I., Davids, K., Fonseca, A. M., & Côté, J. (2016). How structured and unstructured sport activities aid the development of expertise in volleyball players. *Psychology of Sport and Exercise*, 25, 51-59.
- Coutinho, P., Mesquita, I., & Fonseca, A. M. (2016). Talent development in sport: A critical review of pathways to expert performance. *International Journal of Sports Science & Coaching*, 11(2), 279-293.
- Deci, E. L., & Ryan, R. M. (1985). The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality*, 19(2), 109-134.
- DiSanti, J.S., Chase, M.A., Vealey, R., Horn, T. (June 17, 2016). Congruency of expectations between high school coaches and athletes for off-season activities: Is sport diversification a realistic option? North American Society for the Psychology of Sport and Physical Activity, Montreal, QC.
- DiSanti, J.S., & Erickson, K. (2019). Youth sport specialization: A multidisciplinary scoping systematic review. *Journal of Sports Sciences*, 37 (18), 2094-2105.
- DiSanti, J.S., & Erickson, K. (in review). Challenging our understanding of youth sport specialization: An examination and critique of the literature through the lens of Bronfenbrenner’s PPCT Model.
- DiSanti, J.S., Post, E., Bell, D., & Erickson, K. (accepted April 1, 2019). Exploring coach

- perceptions of youth sport specialization: A comparison of high school and club sport contexts. *Journal of Athletic Training*.
- DiSanti, J.S., Wright, E., Chase, M.A., & Erickson, K. (in review). Examining athlete selection of specialized or multi-sport participation: Qualitative content analysis across pathways.
- Eccles, J. S., & Harold, R. D. (1991). Gender differences in sport involvement: Applying the Eccles' expectancy-value model. *Journal of Applied Sport Psychology*, 3(1), 7-35.
- Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & Mac Iver, D. (1993). Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist*, 48(2), 90.
- Elder, G. H., Jr. (1974). *Children of the Great Depression*. Chicago: University of Chicago Press.
- Ericsson, K. A., Krampe, R. T., & Tesch-Römer, C. (1993). The role of deliberate practice in the acquisition of expert performance. *Psychological Review*, 100(3), 363.
- Ford, P. R., Low, J., McRobert, A. P., & Williams, A. M. (2010). Developmental activities that contribute to high or low performance by elite cricket batters when recognizing type of delivery from bowlers' advanced postural cues. *Journal of Sport and Exercise Psychology*, 32(5), 638-654.
- Ford, P. R., Ward, P., Hodges, N. J., & Williams, A. M. (2009). The role of deliberate practice and play in career progression in sport: The early engagement hypothesis. *High Ability Studies*, 20(1), 65-75.
- Fransen, J., Pion, J., Vandendriessche, J., Vandorpe, B., Vaeyens, R., Lenoir, M., & Philippaerts, R. M. (2012). Differences in physical fitness and gross motor coordination in boys aged 6–12 years specializing in one versus sampling more than one sport. *Journal of Sports Sciences*, 30(4), 379-386.
- Fraser-Thomas, J., Côté, J., & Deakin, J. (2008). Understanding dropout and prolonged engagement in adolescent competitive sport. *Psychology of Sport and Exercise*, 9(5), 645-662.
- Ginsburg, R. D., Smith, S. R., Danforth, N., Ceranoglu, T. A., Durant, S. A., Kamin, H., Babcock, R., & Masek, B. (2014). Patterns of specialization in professional baseball players. *Journal of Clinical Sport Psychology*, 8(3), 261-275.
- Gitonga, E., Bailasha, N. K., & Toriola, A. L. (2011). Psycho-social attributes of elite African women volleyball players: Sport psychology. *African Journal for Physical Health Education, Recreation and Dance*, 17(3), 535-546.

- Goodway, J. D., & Robinson, L. E. (2015). Developmental trajectories in early sport specialization: A case for early sampling from a physical growth and motor development perspective. *Kinesiology Review*, 4(3), 267-278.
- Gould, D., & Carson, S. (2008). Life skills development through sport: Current status and future directions. *International Review of Sport and Exercise Psychology*, 1(1), 58-78.
- Green, K., & Smith, A. (Eds.). (2016). Routledge handbook of youth sport. Routledge.
- Gregory, S. (2017, September). How kids' sports became a \$15 billion industry. *Time Magazine*, 190(9). Retrieved from <https://time.com/magazine/us/4913681/september-4th-2017-vol-190-no-9-u-s/>.
- Güllich, A. (2016). International medallists' and non-medallists' developmental sport activities—a matched-pairs analysis. *Journal of Sports Sciences*, 1-8.
- Hall, R., Foss, K. B., Hewett, T. E., & Myer, G. D. (2015). Sport specialization's association with an increased risk of developing anterior knee pain in adolescent female athletes. *Journal of Sport Rehabilitation*, 24(1), 31-35.
- Helsen, W. F., Starkes, J. L., & Hodges, N. J. (1998). Team sports and the theory of deliberate practice. *Journal of Sport and Exercise Psychology*, 20(1), 12-34.
- Hill, G. M., & Hansen, G. F. (1987). Sport specialization in high school: A complex issue. *Physical Educator*, 44(4), 422-426.
- Hill, G. M., & Hansen, G. F. (1988). Specialization in high school sports – The pros and cons. *Journal of Physical Education, Recreation & Dance*, 59(5), 76-79.
- Hill, G. M., & Simons, J. (1989). A study of the sport specialization on high school athletics. *Journal of Sport and Social Issues*, 13(1), 1-13.
- Hill, G. M. (1993). Youth sport participation of professional baseball players. *Sociology of Sport Journal*, 10(1), 107-114.
- Horn, T. S. (2015). Social psychological and developmental perspectives on early sport specialization. *Kinesiology Review*, 4(3), 248-266.
- IBM Corp. Released 2018. IBM SPSS Statistics for Windows, Version 26.0. Armonk, NY: IBM Corp.
- Jayanthi, N., Dechert, A., Durazo, R., Dugas, L., & Luke, A. (2011). Training and sports specialization risks in junior elite tennis players. *Journal of Medicine & Science in Tennis*, 16(1), 14-20.

- Jayanthi, N., Dugas, L., Fischer, D., Pasulka, J., & LaBella, C. (2014). Risks of intense, specialized training and growth for injury in young athletes: A clinical evaluation. *British Journal of Sports Medicine*, 48(7), 611.
- Jayanthi, N. A., LaBella, C. R., Fischer, D., Pasulka, J., & Dugas, L. R. (2015). Sports-specialized intensive training and the risk of injury in young athletes: A clinical case-control study. *The American Journal of Sports Medicine*, 43(4), 794-801.
- Krebs, R. J. (2009). Bronfenbrenner's Bioecological Theory of Human Development and the process of development of sports talent. *International Journal of Sport Psychology*, 40(1), 108.
- Landers, R. Q., Carson, R. L., & Blankenship, B. T. (2010). Special Section: The promise and pitfalls of sport specialization in youth sport. *Journal of Physical Education, Recreation & Dance*, 81(8), 14-39.
- LaPrade, R. F., Agel, J., Baker, J., Brenner, J. S., Cordasco, F. A., Côté, J., ... & Hewett, T. E. (2016). AOSSM early sport specialization consensus statement. *Orthopaedic Journal of Sports Medicine*, 4(4), 2325967116644241.
- Law, M. P., Côté, J., & Ericsson, K. A. (2007). Characteristics of expert development in rhythmic gymnastics: A retrospective study. *International Journal of Sport and Exercise Psychology*, 5(1), 82-103.
- Le Menestrel, S., & Perkins, D. F. (2007). An overview of how sports, out-of-school time, and youth well-being can and do intersect. *New Directions for Student Leadership*, 2007(115), 13-25.
- Leite, N., Baker, J., & Sampaio, J. (2009). Paths to expertise in Portuguese national team athletes. *Journal of Sports Science & Medicine*, 8(4), 560.
- Leite, N., Santos, S., Sampaio, J., & Gómez, M. (2013). The path to expertise in Portuguese and USA basketball players. *Kinesiology*, 45(2), 194-202.
- Livingston, J., Schmidt, C., & Lehman, S. (2016). Competitive club soccer: Parents' assessments of children's early and later sport specialization. *Journal of Sport Behavior*, 39(3), 301.
- Malina, R. M. (2010). Early sport specialization: Roots, effectiveness, risks. *Current Sports Medicine Reports*, 9(6), 364-371.
- Matz, E. (2014, February). The kids are alright. *ESPN: The Magazine*. Retrieved from https://www.espn.com/espn/story/_/id/10496416/are-youth-sports-ruining-kids-childhoods-espn-magazine.

- McCarthy, P. J., Jones, M. V., & Clark-Carter, D. (2008). Understanding enjoyment in youth sport: A developmental perspective. *Psychology of Sport and Exercise*, 9(2), 142-156.
- McFadden, T., Bean, C., Fortier, M., & Post, C. (2016). Investigating the influence of youth hockey specialization on psychological needs (dis) satisfaction, mental health, and mental illness. *Cogent Psychology*, 3(1), 1157975.
- Moesch, K., Elbe, A. M., Hauge, M. L., & Wikman, J. M. (2011). Late specialization: The key to success in centimeters, grams, or seconds (cgs) sports. *Scandinavian Journal of Medicine & Science in Sports*, 21(6).
- Moesch, K., Hauge, M. L. T., Wikman, J. M., & Elbe, A. M. (2013). Making it to the top in team sports: Start later, intensify, and be determined. *Talent Development and Excellence*, 5(2), 85-100.
- Mostafavifar, A. M., Best, T. M., & Myer, G. D. (2013). Early sport specialization, does it lead to long-term problems? *British Journal of Sports Medicine*, 47, 1060-1061.
- Muthén, L. K., & Muthén, B. O. (2011). Mplus User's Guide (6th ed.). Los Angeles, CA: Muthén & Muthén.
- Post, E. G., Bell, D. R., Trigsted, S. M., Pfaller, A. Y., Hetzel, S. J., Brooks, M. A., & McGuine, T. A. (2017). Association of competition volume, club sports, and sport specialization with sex and lower extremity injury history in high school athletes. *Sports Health*.
- Post, E. G., Thein-Nissenbaum, J. M., Stiffler, M. R., Brooks, M. A., Bell, D. R., Sanfilippo, J. L., ... & McGuine, T. A. (2017). High school sport specialization patterns of current Division I athletes. *Sports Health*, 9(2), 148-153.
- Post, E. G., Trigsted, S. M., Riekema, J. W., Hetzel, S., McGuine, T. A., Brooks, M. A., & Bell, D. R. (2017). The association of sport specialization and training volume with injury history in youth athletes. *The American Journal of Sports Medicine*, 45(6), 1405-1412.
- Raedeke, T. D., & Smith, A. L. (2001). Development and preliminary validation of an athlete burnout measure. *Journal of Sport and Exercise Psychology*, 23(4), 281-306.
- Russell, W. D. (2014). The relationship between youth sport specialization, reasons for participation, and youth sport participation motivations: A retrospective study. *Journal of Sport Behavior*, 37(3), 286.
- Russell, W. D., & Limle, A. N. (2013). The relationship between youth sport specialization and involvement in sport and physical activity in young adulthood. *Journal of Sport Behavior*, 36(1), 82.
- Russell, W., & Symonds, M. (2015). A retrospective examination of youth athletes' sport

- motivation and motivational climate across specialization status. *Athletic Insight*, 7(1), 33.
- Smith, M. M. (2015). Early sport specialization: A historical perspective. *Kinesiology Review*, 4(3), 220-229.
- Soberlak, P., & Cote, J. (2003). The developmental activities of elite ice hockey players. *Journal of Applied Sport Psychology*, 15(1), 41-49.
- Starkes, J. L., Deakin, J. M., Allard, F., Hodges, N. J., & Hayes, A. (1996). Deliberate practice in sports: What is it anyway? In: Ericsson, K.A. (ed.) *The road to excellence: The acquisition of expert performance in the arts and sciences, sports, and games*, 81-106.
- Stevenson, C. L. (1990). The athletic career: Some contingencies of sport specialization. *Journal of Sport Behavior*, 13(2), 103.
- Storm, L. K., Kristoffer, H., & Krogh, C. M. (2012). Specialization pathways among elite Danish athletes: A look at the developmental model of sport participation from a cultural perspective. *International Journal of Sport Psychology*, 43(3), 199-222.
- Strachan, L., Côté, J., & Deakin, J. (2009). "Specializers" versus "samplers" in youth sport: Comparing experiences and outcomes. *The Sport Psychologist*, 23(1), 77-92.
- Swindell, H. W., Marcille, M. L., Trofa, D. P., Paulino, F. E., Desai, N. N., Lynch, T. S., ... & Popkin, C. A. (2019). An Analysis of Sports Specialization in NCAA Division I Collegiate Athletics. *Orthopaedic Journal of Sports Medicine*, 7(1), 2325967118821179.
- Tudge, J., Gray, J., & Hogan, D. M. (1997). Ecological perspectives in human development: A comparison of Gibson and Bronfenbrenner. *Comparisons in human development: Understanding time and context*, 72, 105.
- Tudge, J. R., Mokrova, I., Hatfield, B. E., & Karnik, R. B. (2009). Uses and misuses of Bronfenbrenner's bioecological theory of human development. *Journal of Family Theory & Review*, 1(4), 198-210.
- Vealey, R. S. (1985) "Conceptualization of sport-confidence and competitive orientation: Preliminary investigation and instrument development." *Journal of Sport Psychology* 8(3) (1986): 221-246.
- Vealey, R., & Chase, M. (2016). *Best Practice for Youth Sport: Science and Strategies for Positive Athlete Experiences*. Human Kinetics.
- Visek, A. J., Achraati, S. M., Mannix, H. M., McDonnell, K., Harris, B. S., & DiPietro, L. (2015). The fun integration theory: Toward sustaining children and adolescents sport participation. *Journal of Physical Activity and Health*, 12(3), 424-433.

- Voigt, L., & Hohmann, A. (2016). Expert youth coaches' diversification strategies in talent development: A qualitative typology. *International Journal of Sports Science & Coaching*, 11(1), 39-53.
- Ward, P., Hodges, N. J., Starkes, J. L., & Williams, M. A. (2007). The road to excellence: Deliberate practice and the development of expertise. *High Ability Studies*, 18(2), 119-153.
- Wall, M., & Côté, J. (2007). Developmental activities that lead to dropout and investment in sport. *Physical Education and Sport Pedagogy*, 12(1), 77-87.
- Wiersma, L.D. (2000). Risks and benefits of youth sport specialization: Perspectives and recommendations. *Pediatric Exercise Science*, 12(1), 13-22.